L011 0[illegible] - Bure[illegible] County
M[illegible] Chemical Company / DePue
ILD 06[illegible]
Superfund - HRS

L011 000 50[illegible] - Bureau County
Zinc Corp. of America / DePue
ILD 064 [illegible]
Superfund - HRS

Volume 1 of 2

CERCLA

Expanded Site Inspection Report

Illinois Environmental Protection Agency
P. O. Box 19276
Springfield, IL 62794-9276

Confidential Material May be Enclosed

CERCLA

Expanded Site Inspection Report

for

DePue / New Jersey Zinc / Mobil Chemical

ILD 062 340 641

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SECTION 1

INTRODUCTION

The Illinois Environmental Protection Agency's (IEPA or Agency) Pre-Remedial Program was tasked by Region V of the United States Environmental Protection Agency (U.S. EPA) on September 24, 1991 to conduct an Expanded Site Inspection (ESI) of the New Jersey Zinc site (a portion of which is currently owned by Mobil Mining and Minerals Company) located in DePue, Illinois. The New Jersey Zinc Company is now owned by Zinc Corporation of America.

The site was initially placed on the Comprehensive Environmental Response, Compensation and Liability Act Information System (CERCLIS) on April 1, 1979 by U.S. EPA. The site is formally listed on CERCLIS as "DEPUE/NEW JERSEY ZINC/MOBIL CHEM CORP" with "EPA ID NO. ILD 062340641". (This is actually the ILD number of Mobil Mining and Minerals. The U.S. EPA identification number of Zinc Corporation of America, or New Jersey Zinc, is ILD 984783811.) The site was placed on CERCLIS as the result of the 1979 Eckhardt reports, a Congressional survey of the U.S. chemical industry.

According to IEPA files, a Preliminary Assessment (PA) was performed by a U.S. EPA Field Investigation Team (FIT) contractor in December, 1980. A January, 1981 memorandum from the FIT contractor recommended that "no further [CERCLA] action" be conducted at the site, pending the outcome of a lawsuit which the State of Illinois had filed against The New Jersey Zinc Company. According to the CERCLIS database, the site was again evaluated under CERCLA authority and received an HRS ranking dated August 1, 1982. Although unclear, IEPA files also indicate that U.S. EPA's FIT contractor conducted a Preliminary Assessment dated July 1, 1983, and a Screening Site

Inspection (SSI) dated May 8, 1984, and another Screening Site Inspection dated June 10, 1987.

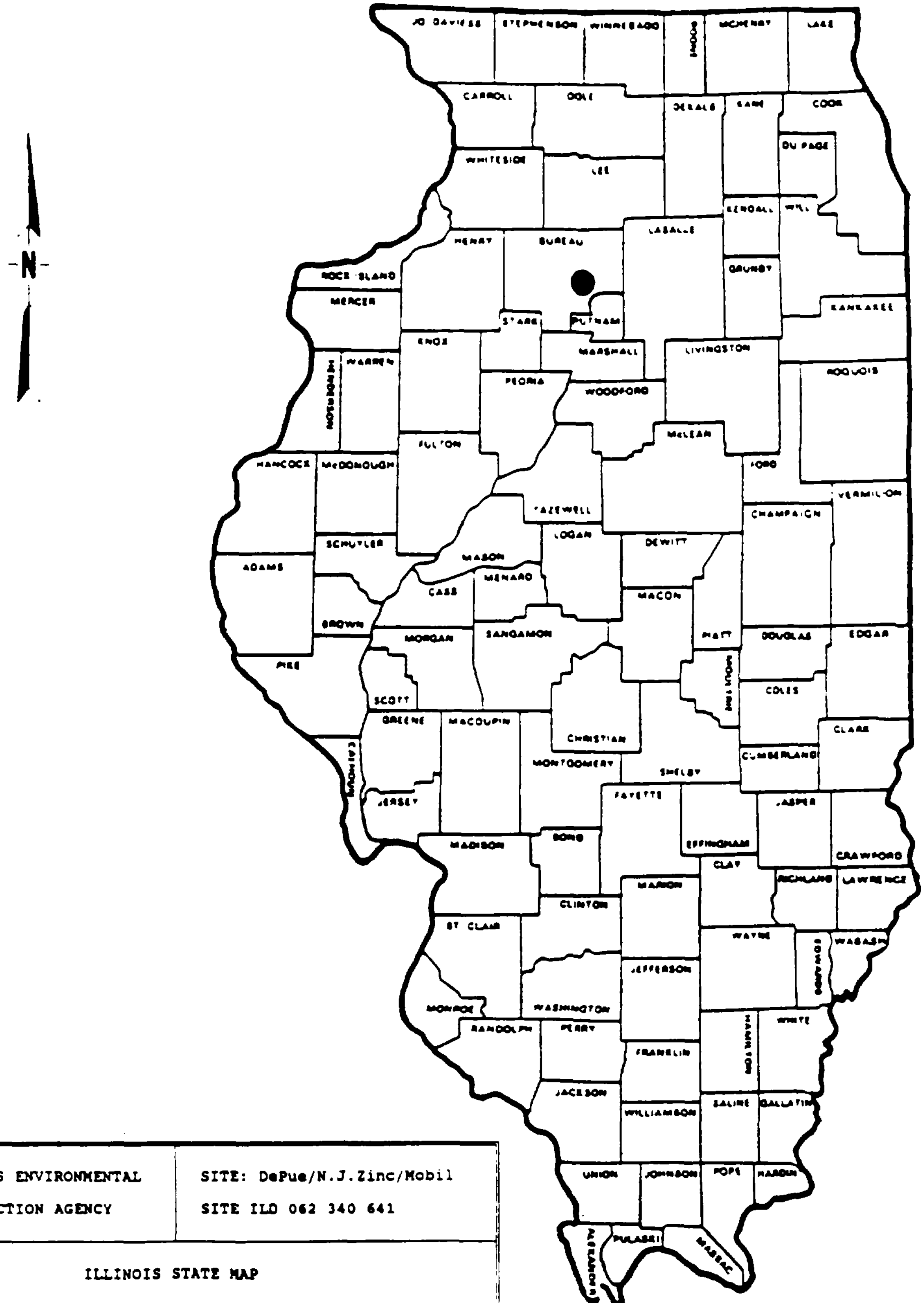
The purpose of a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Expanded Site Inspection (ESI) is to gather the additional information necessary to develop a CERCLA Hazard Ranking System (HRS) proposal. The information required may include characterizing sources and hazardous wastes, attributing contamination to sources at the site, identifying targets which may be at risk, collecting geologic and demographic information, and additional information which may not exist following a Screening Site Inspection or previous CERCLA activities.

This Expanded Site Inspection was initiated when the IEPA Pre-Remedial Program prepared and submitted an "Expanded Site Inspection Work Plan" for the New Jersey Zinc site to Region V U.S. EPA and their consultant, MITRE Corporation, on February 6, 1992. Reconnaissance visits to the site and the surrounding area were conducted on December 13, 1991, January 6, February 24, and March 2, 1992. IEPA representatives met with representatives of Mobil Mining and Minerals Company and Zinc Corporation of America at IEPA headquarters on September 11, 1991 and February 26, 1992. In addition, IEPA representatives met with the Village President and the DePue Board of Trustees on January 6, 1992.

The samples obtained during the Expanded Site Inspection were collected on March 10, 11, and 12, 1992. During the Expanded Site Inspection, the IEPA sampling team collected a total of five (5) surface water samples (including one background surface water sample) and thirty-seven (37) soil/sediment/waste samples (including two background soil samples and one background sediment sample). These samples were "split" with two consulting firms representing Mobil Mining and Minerals Company and

Zinc Corporation of America.

The analytical results of the samples collected during this Expanded Site Inspection were reviewed by IEPA's Office of Chemical Safety. The analytical results were also forwarded to the Environmental Health Division of the Illinois Department of Public Health (IDPH) for review. The IDPH, in addition to their own review, submitted the analytical results to the U.S. Department of Health and Human Services' Agency for Toxic Substances and Disease Registry (ATSDR) for additional review. After formal consultation with the IEPA, both IDPH and ATSDR have recommended further evaluation of the community and nearby residents for health risks associated with residing on or near the New Jersey Zinc site.



ILLINOIS ENVIRONMENTAL PROTECTION AGENCY	SITE: DePue/N.J.Zinc/Mobil SITE ILD 062 340 641
ILLINOIS STATE MAP	
LEGEND: ● Site Location	

SECTION 2

SITE BACKGROUND

2.1 INTRODUCTION

This section includes descriptive, historical, and regulatory information obtained over the course of the formal CERCLA Expanded Site Inspection (ESI) investigation and previous IEPA activities involving the New Jersey Zinc site. Section 1.1 of the revised Hazard Ranking System (HRS) defines "site" as: "Area(s) where a hazardous substance has been deposited, stored, disposed, or placed, or has otherwise come to be located." This may include sources and the area(s) between sources. Additional information about sources at the New Jersey Zinc site is presented in Section 4 of this report. Note that the term "New Jersey Zinc site" as used in this report refers to the HRS definition of "site".

2.2 SITE DESCRIPTION

The New Jersey Zinc site is composed of two general sets of properties. The facility property, originally owned by New Jersey Zinc, which contained the smelter and associated plants. A portion of this facility property was purchased in 1975 by Mobil Chemical Corporation. The second general set of properties consists of the surrounding areas which were never a part of the plant property but have become contaminated as a result of operations at the smelter. This generally includes private properties and property owned by the Village of DePue.

Zinc Corporation of America currently owns approximately sixty (60) acres which are located in Section 35, Township 15 North, Range 10 East of the Fourth Principal Meridian, Bureau County. Mobil Mining and Minerals Corporation currently owns approximately 750 acres which are located in Sections 25, 26, 35, and 36, Township 15 North, Range 10 East of the Fourth Principal Meridian, Bureau County.

The site is located in and immediately north of the Village of DePue, Illinois, just north of the Illinois River. This is approximately four (4) miles south of Interstate 80, and slightly greater than four (4) miles east of Interstate 180. (Refer to Figures 2-1, 2-2 and 2-3). A "4-Mile Radius Map" of the site and surrounding area is contained in Appendix A of this report.

The site is bordered on the north by commercial farmland; to the east by the Village of DePue and an unnamed tributary of Negro Creek; to the south by the Village of DePue and Lake DePue (a backwater lake of the Illinois River); and to the west by the Village of DePue. The topography of the New Jersey Zinc site and the surrounding area contains nearly 200 feet of naturally occurring vertical relief. The Zinc Corporation of America property, located at the eastern side of the site, presently contains two buildings which were once a part of the smelter, a railroad yard, lithopone wastepiles and an extensive zinc smelting wastepile, or gob pile. The remainder of the ZCA property is relatively level as it once contained part of the smelter and rail lines. The Mobil property, located at all but the easternmost side of the original smelter plant site, is currently being demolished. According to Mobil representatives, only one building will remain when the demolition is completed.

2.3 SITE HISTORY

This section provides relatively brief, general and regulatory histories of the activities which have taken place at the New Jersey Zinc site.

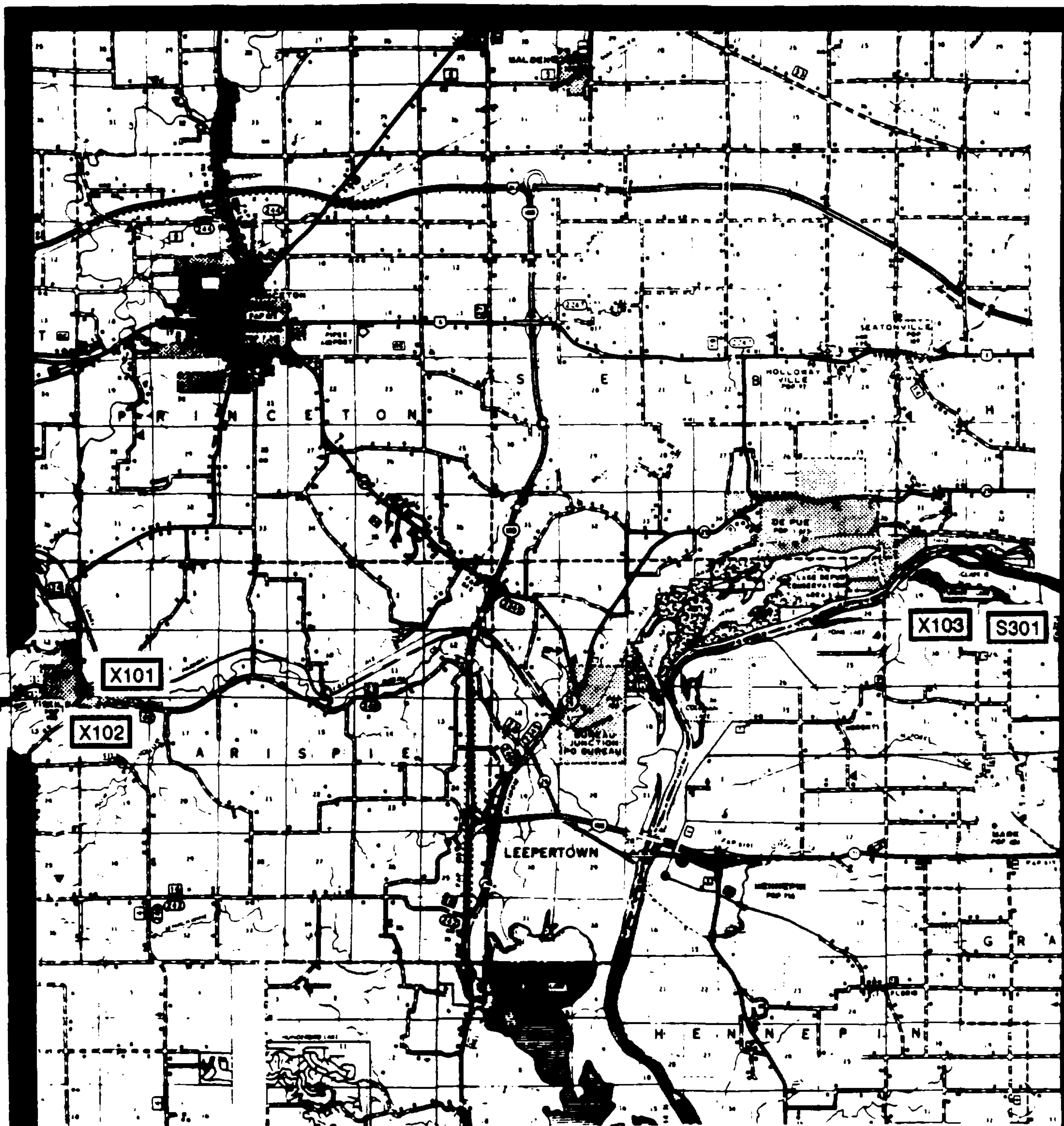
2.3.1 General History

According to Selby Township Library District files, The New Jersey Zinc Company was established in 1848 in the eastern United States. Increased industrial activity at the turn of the century created a demand for slab zinc. In order to meet these demands, The New Jersey Zinc Company chose the DePue location because of the area coal fields and the accessibility to major railroad lines. Construction of the DePue plant began in 1903 on 175 acres of farmland. This initial plant, a primary smelter, produced slab zinc and sulfuric acid. At its peak, the capacity of the seven (7) roasting kilns was reportedly 350 tons of ore per day and the acid units were capable of producing up to 325 tons of sulfuric acid per day. In addition, the plant once produced zinc oxide and "Horse Head Special Zinc", manufactured to be "99.99+ percent pure". The majority of the zinc produced was used by industry in the manufacture of zinc die castings for the automobile and appliance industries. It was used in the manufacture of zinc coatings for the galvanizing industry and as an additive to produce alloys in the brass industry. Zinc dust produced at the facility was also used in the chemical manufacturing industry and as an additive to produce corrosion resistant paints. The zinc dust plant was closed in 1970. It was reactivated in 1971 as a secondary smelter, i.e., scrap zinc was purchased as feedstock. New Jersey Zinc completed demolition of the remaining structures at the facility shortly after the facility ceased operations in 1990.

Due to a growing demand for zinc pigment, a lithopone plant was added to the smelter in 1923. When titanium dioxide became widely used as a pigment, it was no longer profitable to produce lithopone. Due to economics, the lithopone was closed in 1956.

In 1966, a roaster and sulfuric acid plant was built to provide zinc roast for the smelter. Due to unfavorable economics, this plant was closed down in 1971.

Due to an increased demand for phosphate fertilizers in the early 1960's, New Jersey Zinc began construction of a diammonium phosphate (DAP) fertilizer plant in 1966. The DAP plant was shut down in 1971. In 1972, the DAP and sulfuric acid plant was



PREPARED BY THE
DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING AND PROGRAMMING

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY	SITE: DePue/N.J.Zinc/Mobil SITE ILD 062 340 641

REGIONAL AREA MAP

LEGEND: ◯ Site Location

SCALE

leased to the Phosphorous Division of the Minerals Group of Mobil Chemical Company, a division of Mobil Oil Corporation. Mobil later purchased the DAP and sulfuric acid plant in 1975. In 1985, the ownership of the plant was transferred to Mobil Mining and Minerals Company.

Feedstock for the DAP and sulfuric acid plant included sulfur or metallic sulfide from Mobil refineries in Canada, phosphate rock from Mobil mining operations in Florida, and ammonia purchased from Mobil refineries in Texas. Sulfuric acid produced at the plant was used to convert the phosphate rock into phosphoric acid and calcium sulfate (gypsum). The ammonia and phosphoric acid were then combined to produce DAP. Wastestreams generated from these processes included non-contact cooling water which was routed to Lake DePue via the two lagoons and a gypsum slurry from the phosphoric acid plant. The water which accumulated in the ponds of the gypsum wastepile was rerouted back to the phosphoric acid production plant. Make-up and cooling water for the facility was obtained from a pumping station located on the nearby Illinois River. Due to economics, Mobil ceased manufacturing operations at the plant in August, 1987. The plant was then operated as a terminal until December, 1990.

The smelter was reported to have once employed 3000 people. Over the years, the employment fluctuated with varied demand, products produced, and technology. For example, 380 people were employed at the smelter in 1961 and Mobil's fertilizer plant initially employed 117 people in 1972 and 98 people in 1986.

2.3.2 Regulatory History

The IEPA has documented problems with contaminated surface water runoff from the area surrounding the zinc smelting wastepile for approximately twenty years. The drainage from this area enters Lake DePue. New Jersey Zinc filed an application for a

National Pollutant Discharge Elimination System (NPDES) permit (IL 0052183) in 1976 as the result of a lawsuit filed by the State of Illinois. An October 29, 1981 Consent Agreement (78-CH-4) required New Jersey Zinc to regrade two of the lithopone wastepile ridges, including neutralization with lime and adding an adequate soil and vegetative cover. The Consent Agreement also required the company to engineer and execute a cover for the top of the zinc smelting wastepile, install a sewer system to collect surface water runoff from the area near the wastepile and on the wastepile, and provide a sampling and monitoring program.

New Jersey Zinc is currently regulated by a January 19, 1989 Illinois Pollution Control Board order (PCB 88-130). NPDES outfall 001 is located south of Marquette Street and east of Mobil's lagoons at the north end of a "creek" which flows directly into Lake DePue. The contents of this creek are discolored by a green tint. New Jersey Zinc monitors a background point which originates near the lithopone wastepiles, and a point downstream of the smelting wastepile. They then report the difference of the concentrations from these two monitoring points. The theory is that this difference represents the contaminants attributable to the smelting wastepile. However, according to IEPA regional office personnel, the effluent which is discharged into Lake DePue via the unnamed creek typically contains extremely large concentrations of metals.

Mobil filed their first application for an NPDES permit (IL 0032182) in 1974. Their current permit was reissued in April, 1989 and expires on September 30, 1993. Outfall 001 is located at the east side of Mobil's lagoons and flows into the northern end of the creek which receives New Jersey Zinc's effluent. Outfall 002 is located at the gypsum wastepile and has been described as a "seep". During the period when the Mobil plant was in operation, they were generally in compliance with their NPDES permit conditions. However, when the plant was closed in 1987, the discharge from the seep at outfall 002 did not meet the requirements contained in the NPDES permit. This problem is not as severe as it once was, but a problem does still exist.

Conversations with DePue residents indicate that, on at least one occassion, an accidental release of an airborne substance from the Mobil plant occurred during its operating period. Reportedly, this material disfigured the paint finish of automobiles in the surrounding areas, and Mobil reimbursed the residents for the physical damage which was caused to their automobiles, i.e., they were reportedly repainted.

An accidental spill of concentrated sulfuric acid from the Mobil plant on May 15, 1980 entered the DePue sanitary sewer system. The acid apparantly reacted with materials in the sewer system and created hydrogen sulfide gas. This toxic gas was detected several homes and the city's treatment plant. The gas emanating from the concentrated sulfuric acid or the hydrogen sulfide gas is suspected to have caused the death of one resident.

Mobil notified the IEPA on February 8, 1990 that a leak had been discovered from piping associated with an underground storage tank (IESDA Incident #900361). Reports indicate that both soil and groundwater became contaminated in an area located west of the former DAP and acid plants. One 8000-gallon underground diesel fuel storage tank and two 1000-gallon underground gasoline storage tanks were removed. Following a focused remedial investigation, Mobil's environmental consultant has been working with IEPA to approve a plan to remediate the soil and the groundwater contamination which resulted from the LUST incident. IEPA's Leaking Underground Storage Tank (LUST) Section formally provided conditional approval of a remedial plan on March 27, 1992.

During the demolition of the Mobil plant in April, 1992, a load of scrap metal was rejected by a salvage yard. The metal contained radioactive deposits, or buildup, generated in the phosphoric acid plant. According to the Illinois Department of Nuclear Safety, the radioactive levels do not pose an extreme health threat.

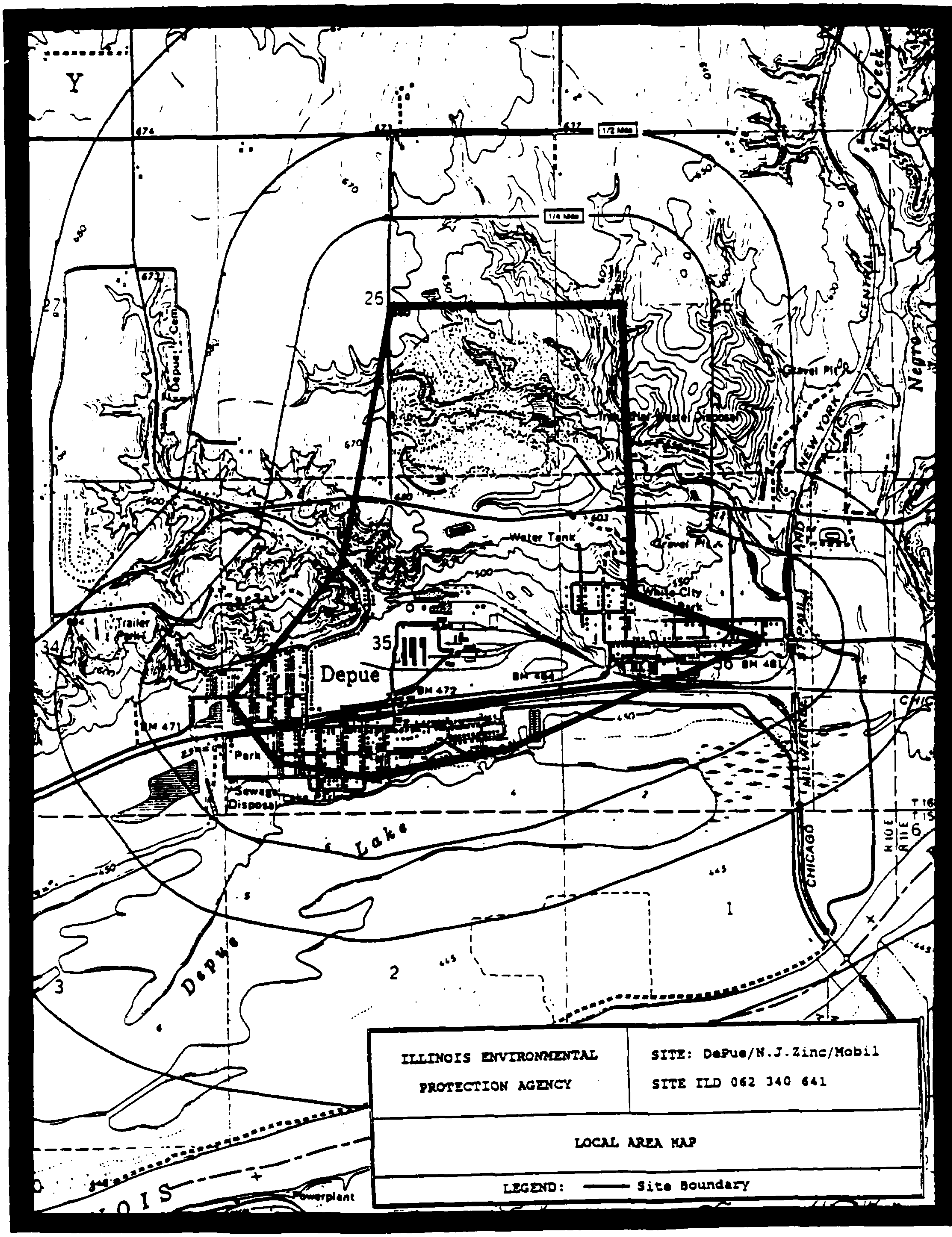
2.4 APPLICABILITY OF OTHER STATUTES

This section provides information regarding the applicability of other environmental statutes to the New Jersey Zinc site. Based on available information, this site does not appear to fall within the jurisdiction of the Atomic Energy Act (AEA), the Uranium Mill Tailings Radiation Control Act (UMTRCA), or the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). In addition, the site appears to be exempt from Resources and Conservation Recovery Act (RCRA) regulations.

The rules and regulations of the State of Illinois exclude primary zinc smelting slag from RCRA regulation [35 Ill. Admin. Code, Section 721.104 (b) (7)]. Information contained in the IEPA Bureau of Land files indicates that New Jersey Zinc's DePue Plant Manager filed a "Notification of Hazardous Waste Activity" form signed March 19, 1990. It appears that this was for paint wastes and associated products which were being overpacked for removal from the site.

Information contained in the IEPA Bureau of Land files indicates that Mobil Chemical Company's DePue facility filed an interim status RCRA Part A application dated November 14, 1980 for the storage of wastes produced during the manufacture of phosphate fertilizer, sulfuric acid, and phosphoric acid, i.e., the gypsum wastepile. It was later determined that the wastepile was exempt. This decision was based on the November 19, 1980 amendment of 40 CFR Part 261 excluding phosphate rock processing. Mobil has informed the IEPA that the contents of the wastepile are "non-hazardous". The rules and regulations of the State of Illinois exclude the non-hazardous the gypsum wastepile from RCRA regulation [35 Ill. Admin. Code, Section 721.104 (b)

(7)].


ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
SITE: DePue/N.J.Zinc/Mobil
SITE ILD 062 340 641
LOCAL AREA MAP
LEGEND: Site Boundary
1/2 Mile
1/4 Mile
Depue
Depue Cem
Trailer Park
Industrial Waste Disposal
Gravel Pit
Water Tank
White City Park
Park
Sewage Disposal
Lake
Depue
NEW YORK
CENTRAL
CHICAGO
MILWAUKEE
Powerplant
BM 471
BM 472
BM 464
BM 461
Y
26
27
34
35
25
1
2
3

SECTION 3

EXPANDED SITE INSPECTION ACTIVITIES

3.1 INTRODUCTION

This section outlines procedures utilized and observations made during the CERCLA Expanded Site Inspection (ESI) conducted at the New Jersey Zinc site. Specific portions of this section contain information pertaining to reconnaissance inspections, site representative interviews, soil, sediment, waste material, and surface water sampling, decontamination procedures, and the associated analytical results. The ESI for the New Jersey Zinc site was conducted in accordance with the site inspection work plan which was developed and submitted to U.S. EPA Region V prior to the initiation of field sampling activities.

3.2 RECONNAISSANCE INSPECTION

Reconnaissance visits were conducted on December 13, 1991, January 6, February 24, and March 2, 1992 by project manager Bruce Ford and Al Kirwin (former project manager who is no longer employed by IEPA) and other representatives of IEPA's Bureau of Land. In addition, Mrs. Virginia Wood of IEPA's Office of Community Relations visited the area on February 27 and March 3, 1992 and obtained formal permission to collect samples from selected residential yards throughout the village of DePue.

During these reconnaissance visits, the following representatives of Mobil and New Jersey Zinc were interviewed: Robert Barnes, David W. Claus, and Ed Voights. During these interviews, the facility representatives politely answered the IEPA representatives' questions. In addition, the IEPA representatives answered the facility representative's questions and explained the purpose and potential results of the CERCLA Expanded Site

Inspection. With the exception of the gypsum wastepile at the northern end of the site and the top of the zinc smelting wastepile, the Agency representatives physically toured and inspected most of the site during the visits.

3.3 SITE REPRESENTATIVE INTERVIEW

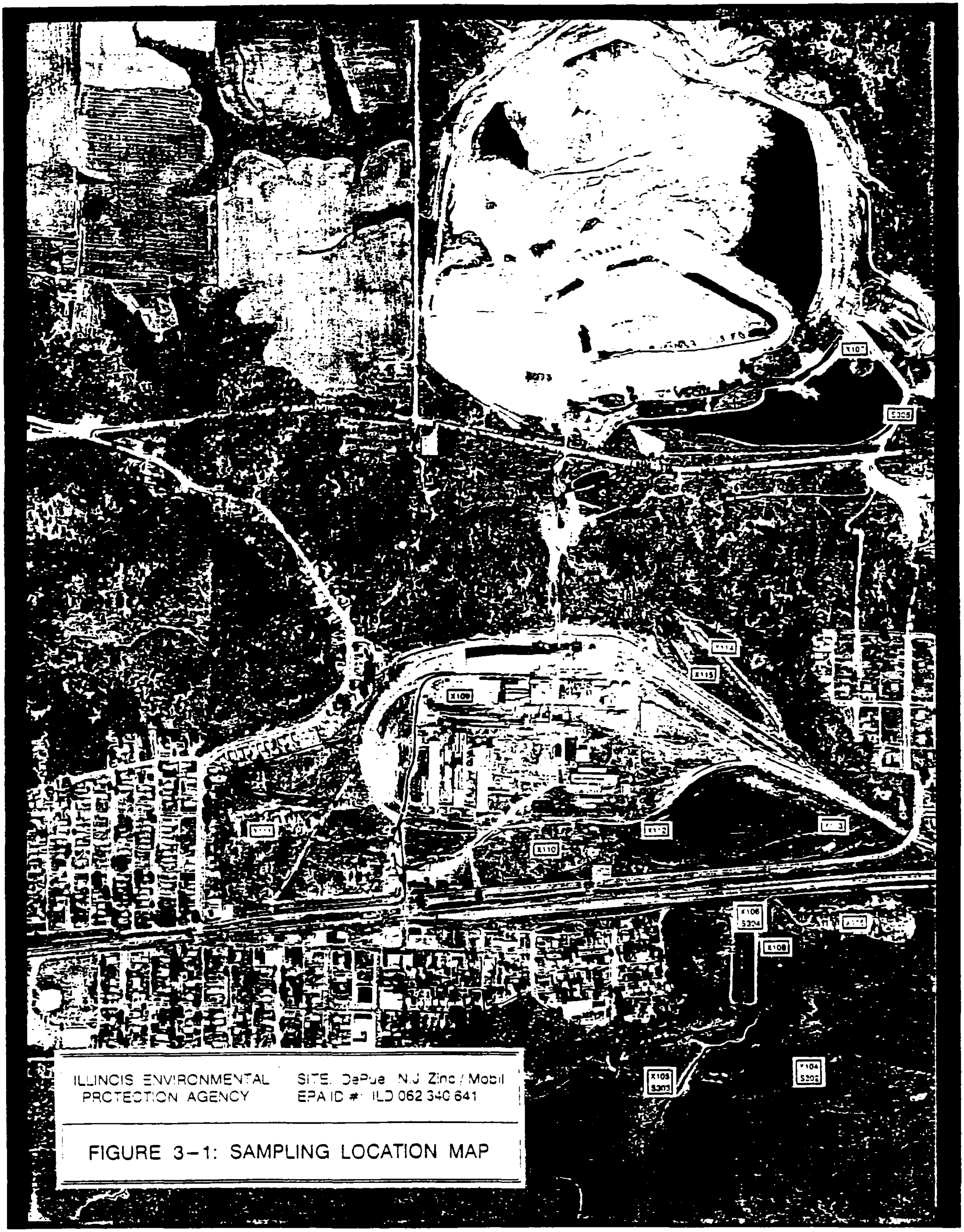
Prior to the ESI, the Agency mailed February 4 and February 13, 1992 letters to the appropriate representatives of Mobil Mining and Minerals Company and Zinc Corporation of America which provided notification of the upcoming ESI sampling activities. The bulk of the site representative interviews were conducted during the reconnaissance inspections described above in Section 3.2. Additional interviews occurred during the September 11, 1991 and February 26, 1992 meetings which were held at IEPA headquarters with representatives of Mobil and ZCA. Additional discussion occurred just prior to and during the sampling activities of March 10, 11, and 12, 1992. Additional details were discussed during September 29 and 30, 1992 telephone conversations with company representatives.

3.4 GROUNDWATER SAMPLING

No groundwater samples were collected during this ESI.

3.5 SURFACE WATER SAMPLING

IEPA personnel collected four (4) surface water samples (including one field duplicate) on March 10, 1992 to determine if contaminants identified at the New Jersey Zinc site were present in surface water targets of concern. IEPA personnel also collected one (1) background surface water sample from Turner Lake on March 12, 1992. Figures 2-2 and 3-1 indicate the locations of each of the surface water samples collected during the ESI.



ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

SITE: DePue N.J Zinc / Mobil
EPA ID #: ILD 062 340 641

FIGURE 3-1: SAMPLING LOCATION MAP

The surface water samples were collected directly into sterile sampling bottles provided by the IEPA's Contract Laboratory Program (CLP). The proper preservatives were added to the appropriate inorganic sample bottles immediately after each bottle was filled. In instances when a surface water sample and a sediment sample were collected from the same or near the same location, i.e., S301, S302, S303, and S304, the surface water sample was collected prior to the sediment sample. This was to reduce the likelihood of disturbed, suspended sediments from interfering with the surface water analytical results.

Surface water samples were also "split" with Steve Walker and Doug Grant of Terra Environmental Services, Inc., Mobil's environmental consultant and Mike Sommers of Rapps Engineering, Zinc Corporation of America's environmental consultant. In addition to the IEPA sampling team and the previously named consultants, Bob Barnes, local representative of Mobil, and David Claus and Ed Voight, local representatives of ZCA, were present during nearly all sampling activities. Jack Adam of IEPA's Bureau of Water, Rockford regional office, was present during the collection of samples S302 and S303. Mr. Larry Hinson, Environmental Affairs Manager of Mobil Mining and Minerals Company was present during the collection of background surface water sample S301.

The IEPA surface water sample bottles were packaged and sealed in accordance with previously documented IEPA Pre-Remedial Program procedures. The IEPA surface water samples were analyzed for organic and inorganic Target Compound List parameters by the Agency's organic and inorganic laboratories. Photographs of the ESI field sampling activities and a copy of the Target Compound List are provided in Appendices D and E of this report, respectively. Table 3-1 provides a summary of the analyses performed on each sample.

Decontamination procedures are not applicable since, as previously noted, the surface water samples were collected directly into the sample bottles.

3.6 SOIL, SEDIMENT, AND WASTE MATERIAL SAMPLING PROCEDURES

IEPA personnel (Bob Casper, Greg Dunn, and project managers Bruce Ford and Al Kirwin) collected a total of thirty seven (37) soil, sediment, and (solid) waste material samples (including one duplicate) on March 10, 11, and 12, 1992 to determine if Target Compound List parameters and/or other contaminants were present at the New Jersey Zinc site or nearby targets of concern. Figures 2-2 and 3-1 indicate the locations of soil, sediment, waste material and surface water samples obtained during the ESI. Appendix C contains a map which indicates the location of the residential soil samples collected in DePue. Table 3-2 summarizes the depth from which each soil sample was obtained, the physical appearance, and the location of each sampling point with reference to nearby stationary landmarks.

The shallow soil and waste material samples and the sediment samples were collected with stainless steel spoons and the deeper soil samples were collected with stainless steel bucket augers or mud augers, all of which had been properly decontaminated at IEPA's warehouse. The soil, sediment, and waste material samples were transferred from the sampling device directly into IEPA sample jars supplied by IEPA's Contract Laboratory Program. These samples were also "split" with Steve Walker and Doug Grant of Terra Environmental Services, Inc., Mobil's environmental consultant and Mike Sommers of Rapps Engineering, Zinc Corporation of America's environmental consultant. In addition to the IEPA sampling team and the previously named consultants, Bob Barnes, local representative of Mobil, and David Claus and Ed Voight, local representatives of ZCA, were present during nearly all sampling activities. Jack Adam of IEPA's Bureau

TABLE 3-1
SUMMARY OF ANALYSES PERFORMED

Sample	Volatile Organic Compounds	Semi-Volatile Organic Compounds	Inorganics
S301	X	X	X
S302	X	X	X
S303	X	X	X
S304	X	X	X
S305	X	X	X
X101	.	.	X
X102	.	.	X
X103	X	X	X
X104	X	X	X
X105	X	X	X
X106	X	X	X
X107	X	X	X
X108	X	X	X
X109	X	X	X
X110	.	.	X
X111	.	.	X
X112	.	.	X
X113	.	.	X
X114	.	.	X
X115	.	.	X
X116	.	.	X
X117	.	.	X
X118	.	.	X
X119	.	.	X
X120	.	.	X
X121	.	.	X
X122	.	.	X
X123	.	.	X
X124	.	.	X
X125	.	.	X
X126	.	.	X
X127	.	.	X
X128	.	.	X
X129	.	.	X
X130	.	.	X
X131	.	.	X
X132	.	.	X
X133	.	.	X
X134	.	.	X
X135	.	.	X
X136	.	.	X
X137	.	.	X

of Water, Rockford regional office, was present during the collection of sediment samples X104 and X105. Mr. Larry Hinson of Mobil Mining and Minerals Company arrived during the afternoon of March 11, 1992 and was present during nearly all sampling activities which occurred on the afternoon of March 11 and on March 12, 1992.

The IEPA soil and sediment sample bottles were packaged and sealed in accordance with previously documented Agency Pre-Remedial Program procedures. The IEPA samples were analyzed for selected Target Compound List parameters by the Agency's organic and inorganic laboratories located in Springfield and Champaign, Illinois, respectively. Photographs of the Screening Site Inspection field sampling activities and a copy of the Target Compound List and are provided in Appendices D and E of this report, respectively. Table 3-1 provides a summary of the analyses performed on each sample.

Standard IEPA decontamination procedures were followed prior to the collection of all soil, sediment, and waste material samples. The decontamination procedures, performed at the IEPA warehouse, included the steamcleaning of all equipment (spoons, trowels. bucket augers, mud augers, extensions and handles, etc.), scrubbing with a non-foaming Trisodium Phosphate (TSP) or a liquid Alconox ^{R} solution, rinsing with hot tap water, rinsing with acetone, rinsing again with hot tap water, final rinsing with deionized, distilled water, and air dried, respectively. All equipment was then wrapped and stored in heavy duty aluminum foil prior to transporting to the field.

3.7 SIGNIFICANT ANALYTICAL RESULTS

The purpose of this section is to provide information on "key samples", or analytical data obtained during the New Jersey Zinc ESI which meets the criteria outlined in the HRS for establishing an observed release. Table 3-2, "Key Findings", provides a summary of those samples collected during the CERCLA Screening Site Inspection and the corresponding analytical data which meet these criteria. The criteria used to determine what may be considered a "significant concentration" or an observed release was based on U.S. EPA *draft* CERCLA HRS guidance.

The analytical results of the five surface water samples (S301 - S305) did not indicate the presence of any volatile or semi-volatile organic compounds. The analytical results do, however, indicate significant concentrations of aluminum, calcium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, sodium, vanadium, zinc, sulfate, and ammonia. (Concentrations of cadmium and selenium were estimated ("J"). Since the bias of the estimations is unknown, these concentrations cannot be considered as being significant at this time. This may change once a bias has been properly determined.) Surface water sample S301 is the background to which the sample data was compared.

The analytical results of the two background soil samples (X101 and X102) and the background sediment sample (X103) did not indicate the presence of any volatile or semi-volatile organic compounds (with the exception of a tentatively identified compound in sediment sample X103). The source of these contaminants is unknown. The analytical results do not indicate any elevated concentrations of inorganic parameters.

The analytical results of target and source sediment samples (X104, X105, X106, and X108) indicate significant concentrations of acetone (which may be a laboratory artifact), bis(2-ethylhexyl)phthalate, and a tentatively identified compound, benzaldehyde. With the exception of sediment/waste material sample X106, the analytical results also indicate significant concentrations of barium, cadmium, cobalt, copper, lead, lead, manganese, mercury, silver, sodium, and zinc. The analytical data of these four samples was compared to background sediment sample X103.

The analytical results of waste material sample X107 did not indicate the presence of any volatile or semi-volatile organic compounds. In addition, the analytical results indicate a significant concentration of one inorganic parameter, calcium. The analytical results of this waste material sample was compared to background soil samples X101 and X102 (using the most stringent guidelines, when needed, to quantify the sample data as a significant concentration). It should be noted that this waste material is known to contain concentrations of radon.

The analytical results of the three soil/waste material samples (X109, X110 and X111) collected from the "plant area" did not indicate the presence of any volatile or semi-volatile organic compounds. (Note that only sample X109 was analyzed for organic compounds.) The analytical results of these three samples do, however, indicate significant concentrations of arsenic, barium, cadmium, calcium, cobalt, copper, iron, lead, magnesium, manganese, selenium, silver, and zinc. The analytical results of these waste material samples were compared to background soil samples X101 and X102 (using the most stringent guidelines, when needed, to quantify the sample data as a significant concentration).

The analytical results of waste material samples (X112 -X117), collected from wastepiles at the site, indicate significant concentrations of arsenic, barium, cadmium, chromium (total), cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, silver, sodium, vanadium, zinc and cyanide. The analytical results of these waste material samples were compared to background soil samples X101 and X102 (using the most stringent guidelines, when needed, to quantify the sample data as a significant concentration).

The analytical results of the twenty residential soil samples collected throughout DePue (X118 - X137) indicate significant concentrations of barium, cadmium, calcium, lead, magnesium, manganese, selenium, and zinc. (Concentrations of arsenic, copper, silver were estimated ("J"). Since the bias of the estimations is unknown, these concentrations cannot be considered as being significant at this time. This may change once a bias has been properly determined.) Soil samples X101 and X102 are the background samples for these residential soil samples.

The source of the organic compounds detected in the ESI samples may be questionable. However, the significant concentrations of the inorganic parameters detected are being attributed to the sources and the former operations conducted at the New Jersey Zinc site. The metals are specifically attributed to the former operations conducted at the smelter and the associated waste sources. The sulfate and ammonia present in the surface water samples are specifically attributed to the former operations conducted at the DAP fertilizer, sulfuric and phosphoric acid plant and the associated waste sources.

Table 3–2

Key Findings

Sample	Depth	Appearance	Location	Compound(s)	Concentration	Background Concentration	Background Sample
S301 Background	NA	Described as "slightly turbid" by sampler	Near SE corner of Turner Lake	Not Applicable (NA)	NA	NA	NA
S302	3" below surface	Cloudy with a green tint	N. side of Lake DePue approximately 72 yards east of centerline of Mobil's lagoons Same location as X104	Aluminum	1780 ug/l	118 B ug/l	S301
				Calcium	110,000 ug/l	7400 ug/l	
				Cobalt	22.9 B ug/l	3.0 UJ ug/l	
				Copper	36.8 ug/l	5.0 U ug/l	
				Iron	1330 ug/l	345 ug/l	
				Manganese	2180 ug/l	135 ug/l	
				Vanadium	9.14 B ug/l	3.0 U ug/l	
				Zinc	5310 ug/l	17.9 B ug/l	
				Ammonia	618 ug/l	10 U ug/l	
S303	3" below surface	Coudy with a yellowish–green tint	N. side of Lake DePue at mouth of creek which receives Mobil & ZCA NPDES discharges Same location as X105	Aluminum	380 ug/l	118 B ug/l	S301
				Calcium	127,000 ug/l	7400 ug/l	
				Cobalt	59.4 ug/l	3.0 UJ ug/l	
				Copper	130 ug/l	5.0 U ug/l	
				Manganese	5040 ug/l	135 ug/l	
				Nickel	40.3 ug/l	13.0 U ug/l	
				Zinc	26,500 ug/l	17.9 B ug/l	
				Sulfate	342,000 ug/l	86,000 ug/l	
				Ammonia	2380 ug/l	10 U ug/l	

Table 3-2

Key Findings

Sample	Depth	Appearance	Location	Compound(s)	Concentration		Background Concentration		Background Sample
S304	3" below	Green tint, slightly	E. side of eastern	Aluminum	2490	ug/l	118 B	ug/l	(Compared
	surface	turbid	Mobil lagoon, 128 feet	Calcium	105,000	ug/l	7400	ug/l	to S301)
			S. of clay inlet pipe located	Cobalt	253	ug/l	3.0 UJ	ug/l	
			at N. end of lagoon	Copper	86.2	ug/l	5.0 U	ug/l	
			Same location as X106	Iron	1720	ug/l	345	ug/l	
				Lead	40.4	ug/l	1.0 U	ug/l	
				Manganese	15,300	ug/l	135	ug/l	
				Nickel	222	ug/l	13.0 U	ug/l	
				Vanadium	7.23 B	ug/l	3.0 U	ug/l	
				Zinc	62,700	ug/l	17.9 B	ug/l	
				Sulfate	650,000	ug/l	86,000	ug/l	
				Ammonia	54,600	ug/l	10 U	ug/l	
S305		Turbid with a light	E. side of Mobil's "clear	Aluminum	2630	ug/l	118 B	ug/l	(Compared
		brown tint	water pond" located at	Arsenic	368	ug/l	2.6 J	ug/l	to S301)
			SE corner of gypsum	Calcium	299,000	ug/l	7400	ug/l	
			wastepile (approx. 105	Chromium	33.0	ug/l	3.0 UJ	ug/l	
			feet west of "staff gauge")	Cobalt	44.4 B	ug/l	3.0 UJ	ug/l	
				Iron	3340	ug/l	345	ug/l	
				Magnesium	421,000	ug/l	31,100	ug/l	
				Manganese	4810	ug/l	135	ug/l	
				Mercury	0.30	ug/l	0.09 B	ug/l	
				Nickel	147	ug/l	13.0 U	ug/l	
				Potassium	87,300	ug/l	3740	ug/l	
				Sodium	675,000	ug/l	28,300	ug/l	
				Vanadium	21.9 B	ug/l	3.0 U	ug/l	
				Zinc	517	ug/l	17.9 B	ug/l	
				Sulfate	3,480,000	ug/l	86,000	ug/l	
				Ammonia	346,000	ug/l	10 U	ug/l	

Table 3-2

Key Findings

Sample	Depth	Appearance	Location	Compound(s)	Concentration	Background Concentration	Background Sample
X101 Background Soil Type "8"	1" - 2"	Dark brown to black silty loam	Tiskilwa: 635 E. Main St. 27'2" S and 1' E of SWc (porch) of house	NA	NA	NA	NA
X102 Background Soil Type "9"	1" - 2"	Dark brown to black silty loam	Tiskilwa: 200 State St. 28'9" W of sidewalk 30'10" N of center of alley 78'8" S of house	NA	NA	NA	NA
X103 Background Sediment		Dark gray clay, silt	Near SE corner of Turner Lake Approx. 27 yards W of S301	NA	NA	NA	NA
X104	2" - 8"	Gray-black, silty clay to clay at bottom	N. side of Lake DePue approximately 72 yards east of centerline of Mobil's lagoons Same location as S302	Cadmium	12.3 mg/kg	0.96 mg/kg	X103
				Copper	73.1 mg/kg	19.7 mg/kg	
				Zinc	2170 mg/kg	173.0 mg/kg	
				Bis(2-ethylhexyl)phthalate	650 ug/kg	490 U ug/kg	
X105	0" - 4"	Thin, yellowish, fine-grained layer overlying gray to black silty clay	N. side of Lake DePue at mouth of creek which receives Mobil & ZCA NPDES discharges Same location as S303	Cadmium	275 mg/kg	0.96 mg/kg	X103
				Cobalt	51.1 mg/kg	8.12 mg/kg	
				Copper	4420 mg/kg	19.7 mg/kg	
				Mercury	0.93 J mg/kg	0.02 UJ mg/kg	
				Silver	2.2 B mg/kg	0.75 U mg/kg	
				Zinc	64,800 mg/kg	173.0 mg/kg	
				Bis(2-ethylhexyl)phthalate	750 ug/kg	490 U ug/kg	
				TIC: Benzaldehyde	7800 ug/kg	TIC was not detected	
X106	0" - 8"	Light gray to black, silt and sand, some pebble sized matter present	E side of eastern Mobil lagoon, 128 feet S of clay inlet pipe located at N. end of lagoon Same location as S304	Acetone	23 ug/kg	21 U ug/kg	(Compared to X103)

Table 3

Key Findings

Sample	Depth	Appearance	Location	Compound(s)	Concentration		Background Concentration		Background Sample
X107	0" – 1"	White, fine-grained gypsum material Very hard and compact below approx. 1' deep	SE quarter of Mobil's gypsum wastepile Sedimented area on N side, E end of "clearwater pond" 145'0" W and 30'5" S of lg. discharge pipe	Calcium	125,000	mg/kg	13,400	mg/kg	(Compared to X101 and X102)
X108	0" – 2"	Fine-grained, loose, silty material Yellowish, green layer overlying light to dark brown silty material	Northern end of creek which receives Mobil and ZCA NPDES discharges. Western bank approx. 26 yards S of point at which ditch from Mobil lagoons enters the creek	Barium	710	mg/kg	112	mg/kg	(Compared to X103)
				Cadmium	112	mg/kg	0.96	mg/kg	
				Cobalt	50.8	mg/kg	8.12	mg/kg	
				Copper	3400	mg/kg	19.7	mg/kg	
				Lead	354	mg/kg	75.6	mg/kg	
				Manganese	2020	mg/kg	537	mg/kg	
				Silver	2.5 B	mg/kg	0.75 U	mg/kg	
				Sodium	889 B	mg/kg	245 B	mg/kg	
				Zinc	22,500	mg/kg	173.0	mg/kg	
X109	0" – 6"	4" layer of light brown sand and silt, fine to coarse grained with some pebbles over-laying a gray silty clay with pebbles	Near NW corner of "plant area" SW of Mobil LUST excavation E of fuel tanks 119' W and 23' N of SW corner of green Mobil pole barn, or office	Cadmium	20.6	mg/kg	0.71	mg/kg	(Compared to X101 and X102)
				Calcium	81,100	mg/kg	13,400	mg/kg	
				Copper	94.1	mg/kg	23.6	mg/kg	
				Magnesium	37,100	mg/kg	6440 B	mg/kg	
				Silver	1.9	mg/kg	0.68 U	mg/kg	
				Zinc	4510	mg/kg	296	mg/kg	
X110	< 1 foot	Dark brown to black, fine to coarse grained fill material	South-central portion of "plant area" 287' N of wooden fence (near Marquette St.) and 393' W of chain link fence surrounding IP electrical substation at S side of site	Arsenic	268	mg/kg	6.0	mg/kg	(Compared to X101 and X102)
				Barium	3510	mg/kg	174	mg/kg	
				Cadmium	278	mg/kg	0.71	mg/kg	
				Cobalt	30.5	mg/kg	6.0 B	mg/kg	
				Copper	1960	mg/kg	23.6	mg/kg	
				Iron	64,700	mg/kg	16,100	mg/kg	
				Lead	17,800	mg/kg	207	mg/kg	
				Manganese	2830	mg/kg	576	mg/kg	
				Selenium	8.2	mg/kg	0.37 B	mg/kg	
				Silver	34.5	mg/kg	0.68 U	mg/kg	
				Zinc	65,600	mg/kg	296	mg/kg	

Table 3–2

Key Findings

Sample	Depth	Appearance	Location	Compound(s)	Concentration		Background Concentration		Background Sample
X111	2" – 6"	Dark brown to black,	Near SW ocrner of "plant	Arsenic	113	mg/kg	6.0	mg/kg	(Compared
		fine to coarse grained	area" 143'5" N and 51'5" E	Barium	4860	mg/kg	174	mg/kg	to X101
		fill material	of large vertical pipe on NW	Cadmium	55.0	mg/kg	0.71	mg/kg	and X102)
			side of abd. "Lakewater Storage	Copper	717	mg/kg	23.6	mg/kg	
			Tank" on Mobil property	Iron	199,000	mg/kg	16,100	mg/kg	
				Lead	33,400	mg/kg	207	mg/kg	
				Manganese	1870	mg/kg	576	mg/kg	
				Silver	26.9	mg/kg	0.68 U	mg/kg	
				Zinc	22,900	mg/kg	296	mg/kg	
X112	< 1 foot	Fine–grained	NJZ smelting wastepile (gob	Arsenic	144	mg/kg	6.0	mg/kg	(Compared
		black material	pile) N side, western end	Cadmium	365	mg/kg	0.71	mg/kg	to X101
			Approx. 4' above surrounding	Cobalt	31.6	mg/kg	6.0 B	mg/kg	and X102)
			ground level. 124 yards E	Copper	8070	mg/kg	23.6	mg/kg	
			and 45 yards S of SE corner	Iron	126,000	mg/kg	16,100	mg/kg	
			of NJZ existing brick offices	Lead	3040	mg/kg	207	mg/kg	
				Manganese	3140	mg/kg	576	mg/kg	
				Selenium	35.0	mg/kg	0.37 B	mg/kg	
				Silver	45.9	mg/kg	0.68 U	mg/kg	
				Zinc	105,000	mg/kg	296	mg/kg	
				Cyanide	30.0	mg/kg	1.1 U	mg/kg	

Table 3–2

Key Findings

Sample	Depth	Appearance	Location	Compound(s)	Concentration		Background Concentration		Background Sample
X113	6" – 8"	Fine–grained	NJZ smelting wastepile (gob	Arsenic	164	mg/kg	6.0	mg/kg	(Compared
		black material	pile) Eastern end Approx.	Cadmium	591	mg/kg	0.71	mg/kg	to X101
			6' above surrounding ground	Cobalt	62.0	mg/kg	6.0 B	mg/kg	and X102)
			level. 96'5" S of southern–	Copper	6200	mg/kg	23.6	mg/kg	
			most rail of RR tracks located	Iron	103,000	mg/kg	16,100	mg/kg	
			N of the pile	Lead	7030	mg/kg	207	mg/kg	
			surrounding ground level	Manganese	2620	mg/kg	576	mg/kg	
				Selenium	13.3	mg/kg	0.37 B	mg/kg	
				Silver	17.2	mg/kg	0.68 U	mg/kg	
				Sodium	1130	mg/kg	140 B	mg/kg	
				Zinc	148,000	mg/kg	296	mg/kg	
				Cyanide	14.4	mg/kg	1.1 U	mg/kg	
X114	4" – 6"	Fine–grained	Black NJZ lithopone waste–	Arsenic	236	mg/kg	6.0	mg/kg	(Compared
		black material	pile, or ridge, located just N	Cadmium	105	mg/kg	0.71	mg/kg	to X101
			of ridge which was regraded	Cobalt	40.9	mg/kg	6.0 B	mg/kg	and X102)
			112' from W/NW end and	Copper	5900	mg/kg	23.6	mg/kg	
			292' from E/SE end of ridge	Iron	126,000	mg/kg	16,100	mg/kg	
			on N side Approx. 4' above	Lead	3656	mg/kg	207	mg/kg	
			surrounding ground level	Selenium	13.9	mg/kg	0.37 B	mg/kg	
				Silver	53.7	mg/kg	0.68 U	mg/kg	
				Zinc	19,300	mg/kg	296	mg/kg	
				Cyanide	17.6	mg/kg	1.1 U	mg/kg	
X115	< 1 foot	Fine–grained gray	Silver/gray NJZ lithopone	Barium	121,000	mg/kg	174	mg/kg	(Compared
		material with some	wastepile, or ridge, located	Copper	262	mg/kg	23.6	mg/kg	to X101
		consolidated portions	just S of ridge which was	Lead	834	mg/kg	207	mg/kg	and X102)
		present	regraded 76' from W/NW	Silver	3.60	mg/kg	0.68 U	mg/kg	
			end and 211+' from E/SE	Vanadium	101	mg/kg	25.5	mg/kg	
			end of ridge on S side						
			Approx. 9' above surrounding						
			ground level and 4' from top						

Table 3-2

Key Findings

Sample	Depth	Appearance	Location	Compound(s)	Concentration		Background Concentration		Background Sample
X116	1" – 3"	Black, fine-grained fill material	Fill material east of N end of creek which receives Mobil and NJZ NPDES discharges 280' S of middle of southern RR track and 210' E of chain link fence at N end of creek	Arsenic	124	mg/kg	6.0	mg/kg	(Compared to X101 and X102)
				Barium	993	mg/kg	174	mg/kg	
				Cadmium	81.9	mg/kg	0.71	mg/kg	
				Chromium	593	mg/kg	19.2	mg/kg	
				Cobalt	26.9	mg/kg	6.0 B	mg/kg	
				Copper	2040	mg/kg	23.6	mg/kg	
				Iron	56,000	mg/kg	16,100	mg/kg	
				Lead	4400	mg/kg	207	mg/kg	
				Mercury	4.39 J	mg/kg	0.10 UJ	mg/kg	
				Nickel	411	mg/kg	15.6	mg/kg	
				Selenium	5.8	mg/kg	0.37 B	mg/kg	
				Silver	21.3	mg/kg	0.68 U	mg/kg	
				Zinc	22,500	mg/kg	296	mg/kg	
X117	Field duplicate of X115.			Barium	92,400	mg/kg	174	mg/kg	(Compared to X101 and X102)
				Copper	119	mg/kg	23.6	mg/kg	
				Lead	872	mg/kg	207	mg/kg	
				Vanadium	99.1	mg/kg	25.5	mg/kg	
X118	1" – 2"	Light to dark brown silty clay	DePue: 1526 Marquette St. 18' W and 47'5" S of SW corner of house	Cadmium	24.0	mg/kg	0.71	mg/kg	X102
				Selenium	0.29 B	mg/kg	0.17 B	mg/kg	
				Zinc	1740	mg/kg	296	mg/kg	
X119	1" – 2"	Light to dark brown loam	DePue: 1312 Marquette St. 32'8" N and 4'0" E of NE corner of house	Cadmium	47.8 J	mg/kg	0.68 U	mg/kg	X101
				Calcium	29,300	mg/kg	7,020	mg/kg	
				Lead	400	mg/kg	117	mg/kg	
				Zinc	2820	mg/kg	124	mg/kg	
X120	1" – 2"	Light to dark brown loam	DePue: 419 N. Mason St. 34'0" NW of NE corner and 31'2" NE of NW corner of house	Barium	996	mg/kg	104	mg/kg	X101
				Cadmium	52.0 J	mg/kg	0.68 U	mg/kg	
				Lead	512	mg/kg	117	mg/kg	
				Selenium	1.2	mg/kg	0.37 B	mg/kg	
				Zinc	3070	mg/kg	124	mg/kg	

Table 3-2

Key Findings

Sample	Depth	Appearance	Location	Compound(s)	Concentration		Background Concentration		Background Sample
X121	1" – 2"	Dark brown silty loam	DePue: 431 Oak St.	Zinc	467	mg/kg	124	mg/kg	X101
X122	1" – 2"	Medium to dark brown clay-loam	DePue: 111 Mason St.	Cadmium	13.2 J	mg/kg	0.68 U	mg/kg	X101
				Calcium	28,400	mg/kg	7,020	mg/kg	
				Magnesium	17,600	mg/kg	3290	mg/kg	
				Manganese	1180	mg/kg	362	mg/kg	
				Zinc	1210	mg/kg	124	mg/kg	
X123	1" – 2"	Dark brown loam	DePue: 1328 Grant St.	Cadmium	53.1 J	mg/kg	0.71	mg/kg	X101 & X102
				Selenium	1.3	mg/kg	0.37 B	mg/kg	(Soil type
				Zinc	2790	mg/kg	296	mg/kg	borderline)
X124	1" – 2"	Light to dark brown to black sandy, silty loam	DePue: 304 E. Fourth St.	Barium	782	mg/kg	104	mg/kg	X101
				Cadmium	22.6 J	mg/kg	0.68 U	mg/kg	
				Zinc	1820	mg/kg	124	mg/kg	
X125	1" – 2"	Dark brown to black silty loam	DePue: 316 South St.	Barium	5130	mg/kg	174	mg/kg	X102
				Cadmium	97.3 J	mg/kg	0.71	mg/kg	
				Lead	729	mg/kg	207	mg/kg	
				Zinc	6030	mg/kg	296	mg/kg	
X126	1" – 2"	Dark brown silty loam	DePue: 150 E. Fourth St.	Barium	2480	mg/kg	104	mg/kg	X101
				Cadmium	76.8 J	mg/kg	0.68 U	mg/kg	
				Zinc	4060	mg/kg	124	mg/kg	
X127	1" – 2"	Dark brown silty loam	DePue Unit School playground NE corner of Second and Liberty Streets	Barium	736	mg/kg	174	mg/kg	X102
				Zinc	1520	mg/kg	296	mg/kg	
X128	1" – 2"	Dark brown silty loam	DePue: 113 Union St.	No "significant" concentrations.					X101

Table 3–2

Key Findings

Sample	Depth	Appearance	Location	Compound(s)	Concentration		Background Concentration		Background Sample
X129	1" – 2"	Dark brown silty loam with some pebbles	DePue: 204 Poplar St.	Barium	3760	mg/kg	104	mg/kg	X101
				Cadmium	37.6 J	mg/kg	0.68 U	mg/kg	
				Zinc	2240	mg/kg	124	mg/kg	
X130	1" – 2"	Dark brown silty loam	DePue: 204 High St.	Barium	6300	mg/kg	104	mg/kg	X101
				Cadmium	90.2 J	mg/kg	0.68 U	mg/kg	
				Lead	565	mg/kg	117	mg/kg	
				Zinc	5290	mg/kg	124	mg/kg	
X131	1" – 2"	Dark brown silty loam	DePue: 308 Trenton St.	Barium	8710	mg/kg	104	mg/kg	X101
				Cadmium	73.6 J	mg/kg	0.68 U	mg/kg	
				Lead	542	mg/kg	117	mg/kg	
				Zinc	3780	mg/kg	124	mg/kg	
X132	1" – 2"	Dark brown silty loam with a few pebbles	DePue: 121 East St.	Barium	2050	mg/kg	104	mg/kg	X101
				Cadmium	16.2 J	mg/kg	0.68 U	mg/kg	
				Zinc	1490	mg/kg	124	mg/kg	
X133	1" – 2"	Dark brown silty loam	DePue: 229 East St.	Barium	5560	mg/kg	104	mg/kg	X101
				Cadmium	61.2 J	mg/kg	0.68 U	mg/kg	
				Lead	371	mg/kg	117	mg/kg	
				Zinc	4240	mg/kg	124	mg/kg	
X134	1" – 2"	Dark brown sandy, silty loam	DePue: 423 East St.	Barium	6080	mg/kg	104	mg/kg	X101
				Cadmium	80.6 J	mg/kg	0.68 U	mg/kg	
				Lead	432	mg/kg	117	mg/kg	
				Zinc	5190	mg/kg	124	mg/kg	
X135	0.5" – 1.5" (No sod present)	Medium to dark brown to black silty clay loam	DePue: 545 East St.	Barium	2250	mg/kg	104	mg/kg	X101
				Cadmium	98.1 J	mg/kg	0.68 U	mg/kg	
				Calcium	28,500	mg/kg	7,020	mg/kg	
				Lead	393	mg/kg	117	mg/kg	
				Zinc	6580	mg/kg	124	mg/kg	

Table 3-2

Key Findings

Sample	Depth	Appearance	Location	Compound(s)	Concentration		Background Concentration		Background Sample
X136	1" – 2"	Medium to dark brown sandy, silty loam	DePue: 635 East St.	Barium	3330	mg/kg	174	mg/kg	X102
				Cadmium	85.7 J	mg/kg	0.71	mg/kg	
				Zinc	5640	mg/kg	296	mg/kg	
X137	1" – 2"	Brown sandy clay loam with some silt	DePue: 674 East St.	Cadmium	22.2 J	mg/kg	0.71	mg/kg	X102
				Calcium	48,600	mg/kg	13,400	mg/kg	
				Magnesium	24,300	mg/kg	6440	mg/kg	
				Zinc	2190	mg/kg	296	mg/kg	

SECTION 4

IDENTIFICATION OF SOURCES

4.1 INTRODUCTION

This section includes descriptions of the various hazardous waste sources which have been identified during the CERCLA site investigation. Section 1.1 of the revised Hazard Ranking System (HRS) defines a "source" as: "Any area where a hazardous substance has been deposited, stored, disposed, or placed, plus those soils that have become contaminated from migration of a hazardous substance." This does not include surface water sediments or surface water that has become contaminated. Information concerning the location, physical description, use, period of operation, size, and potential to affect the migration pathways along with analytical data obtained during the Expanded Site Inspection (ESI) is presented for each source.

Note that the analytical results of the samples collected from the waste sources during the ESI have been compared to the background soil samples (X101 and X102), the background sediment sample (X103), and the background surface water sample (S301). While these samples are not necessarily backgrounds for the samples obtained from the waste sources, they have been used for comparison purposes as an indication of elevated concentrations.

4.2 ZINC SMELTING WASTE PILE (GOB PILE)

4.2.1 Description

This source, one of the most outstanding features of the New Jersey Zinc site, is located near the southeastern corner of the site. The large, black pile, sometimes referred to as a cinder bank, is composed of waste material generated from the zinc smelting process. Aerial photographs indicate that the pile began accumulating prior to 1937 and has probably not increased substantially since the primary smelting operations ended in 1971.

4.2.2 Waste Characteristics

Two (2) waste material samples were collected from near the western end (X112) and eastern end (X113) of the pile during the ESI. The analytical results of these two waste samples indicate that the pile contains significantly elevated levels of arsenic, cadmium, cobalt, copper, cyanide, iron, lead, manganese, selenium, silver, sodium, and zinc (compared to background soil samples X101 and X102). Based on a U.S. Department of Agriculture 1988 aerial photograph, the large pile occupies a basal area of approximately 14.8 acres. The volume of the approximately thirty (30) to forty (40) feet high pile has not been estimated with any degree of certainty due to the irregularity of the pile's surface topography.

A relatively smaller wastepile exists to the southeast of the large pile. Although not sampled during the ESI, it is believed to be composed of the same wastes as the larger pile. Based on the same aerial photograph, this smaller pile occupies a basal area of approximately 0.28 acres.

4.2.3 Potentially Affected Pathways

All four pathways are potentially threatened by the hazardous substances present in the zinc smelting wastepile, or gob pile. Since the wastepile does not contain any known liner, the groundwater migration pathway is potentially at threat. The wastepile does not technically contain a maintained engineered cover or a functioning and maintained run-on control system and runoff management system, therefore, the surface water migration pathway is potentially at threat. In addition, the surface water runoff from the gob pile is routed to New Jersey Zinc's NPDES outfall which enters the creek and Lake DePue. Note that the contaminants found in the creek and the lake are similar to those contained in the gob pile. The gob pile is located outside of the 100-year floodplain boundary. Regarding the soil exposure pathway, the gob pile is accessible, but is not used for public recreation. The top of the gob pile has been levelled and does contain a vegetative cover (on the top only). The sides of the gob pile, however, are exposed with no cover. In addition, the hazardous substances contained in the wastepile are not contained or controlled in any manner, i.e., covered by liquids or other impermeable cover, surrounded by windbreaks, contained in a building or other container(s). Therefore, contaminated particulate matter from the gob pile creates a threat to the air pathway. This threat is increased due to the large size and great height of the zinc smelting waste pile.

4.3 LITHOPONE WASTE MATERIAL RIDGES

4.3.1 Description

These sources are located near the northeastern corner of the "plant area" of the site. They are located north of the railroad spur which enters the facility from the east, and the ridges roughly parallel the tracks running southeast-northwest. The long, gray, red, and brown piles are composed of waste materials which were generated by the New Jersey Zinc lithopone manufacturing plant which operated from 1923 to 1956. Lithopone is a pigment which contains zinc. The legend of a map/drawing revised in August, 1961 and provided to IEPA by New Jersey Zinc described the ridges as:

"Lithopone Leach and Aeration Residue (Brown)"

"Lithopone Oxidation Tank Residue (Red)"

"Lithopone Barium Roast Leach Residue (Gray)"

"Black Pit = V.F. Wet Bottom Overflow Settlings"

Two of the red lithopone oxidation tank residue ridges were regraded, amended with lime, and covered with soil and vegetation pursuant to a Consent Agreement signed on

October 29, 1981 (78-CH-4). IEPA files indicate that this work was performed prior to August, 1985.

4.3.2 Waste Characteristics

Two (2) waste material samples (plus one field duplicate) were collected from the wastepiles during the ESI. Waste sample X114 was collected from one of the black wastepiles, or ridges. The analytical results of this waste sample indicate that the wastepile contains significantly elevated levels of arsenic, cadmium, cobalt, copper, cyanide, iron, lead, mercury, selenium, silver, and zinc (compared to background soil samples X101 and X102). The length of this particular ridge was measured during the ESI and found to be approximately 404 feet long.

Waste sample X115 (and field duplicate X117) was collected from one of the gray piles. The analytical results of the waste sample indicate that this wastepile contains elevated levels of barium, copper, lead, silver, and sodium (compared to background soil samples X101 and X102). The length of this particular ridge was measured during the ESI and found to be greater than 287 feet long.

Based on an U.S. Department of Agriculture 1970 aerial photograph, the ridges occupy a total basal area of nearly nine (9) acres. The volume of the ridges has not been estimated.

4.3.3 Potentially Affected Pathways

Identical to the circumstances described in section 4.3.3 above for the gob pile, all four pathways are potentially threatened by the hazardous substances present in lithopone waste material ridges. The wastepiles do not contain any known liner(s), maintained engineered cover or a functioning and maintained run-on control system and runoff management system. The surface water runoff from the ridges is routed to New Jersey Zinc's NPDES outfall. The contaminants found in the creek and the lake are similar to those contained in the wastepiles. They are located outside of the 100-year floodplain boundary, and they are accessible, but not used for public recreation. Some trees now exist in the area, but most of the ridges are exposed with no soil or vegetative cover. Therefore, contaminated particulate matter from the ridges creates a threat to the air pathway. It should be noted that the lithopone oxidation tank residue ridge which was levelled and limed does contain a soil cover which was sloped for drainage and is heavily vegetated with grass.

4.4 GYPSUM WASTEPILE ("GYPSUM STACK")

4.4.1 Description

This source, another one of the most outstanding features of the site, is not even visible from the former "plant area" or the majority of the village of DePue. It is located north of State Route 29 and the majority of the site, at the top of a large, relatively steep hill, or bluff. The large, white pile is composed of waste material generated from the fertilizer manufacturing process. Aerial photographs verify that the gypsum wastepile did not begin accumulation prior to the start-up of the diammonium phosphate fertilizer plant in 1967. While Mobil still controls the surface water runoff and leachate from the wastepile, the volume of the pile has not increased substantially since the fertilizer plant formally ceased operations on December 31, 1990.

4.4.2 Waste Characteristics

Waste material sample X107 was collected from the southeast quarter of the gypsum wastepile, just north of one of the sediment control ponds, i.e., the "clearwater pond". The analytical results of this waste sample indicate that the pile contains an elevated level of calcium. (compared to background soil samples X101 and X102). Note, however, that the waste sample was not analyzed for ammonia or sulfate. Based on a U.S. Department of Agriculture 1979 aerial photograph, the wastepile occupies a basal area greater than 150 acres. This value includes the acreage of the sediment control ponds. Note, however, that the ponds are located *on* the pile. The volume of the wastepile has not been estimated with any degree of certainty due to the irregularity of the pile's surface topography.

4.4.3 Potentially Affected Pathways

Similar to the circumstances described in Section 4.3.3 above for the gob pile, all four pathways are potentially threatened by the hazardous substances present in gypsum wastepile. The wastepile does not contain any known liner to prevent contaminants from migrating to groundwater. The wastepile does not contain a maintained engineered cover but it does contain a functioning and maintained run-on control system and runoff management system. As noted in section 4.5, the surface water runoff from the wastepile accumulates in the sediment control ponds. The wastepile is located outside of the 100-year floodplain boundary. It is accessible, but not used for public recreation. No vegetative cover exists on the wastepile, and with the exception of the ponded areas, nothing is present to inhibit the release of cotaminated particulate matter. This is a direct threat to the air pathway. This threat is increased due to the large surface area of the wastepile and its relatively high elevation.

4.5 GYPSUM WASTEPILE SEDIMENT CONTROL PONDS

4.5.1 Description

A number of sediment control ponds are located on the gypsum wastepile described in Section 4.4, above. When the fertilizer manufacturing plant was active, the waste gypsum material was pumped and deposited on the "gypsum stack" in slurry form. The ponds, or basins, were originally constructed to control the liquids which leached out of the gypsum waste. The water which accumulated in the ponds was pumped through piping to Mobil's lagoons (refer to section 4.6). Since the fertilizer production has ceased, the ponds still act as points for excess water and runoff to accumulate. July, 1991 aerial photographs obtained by the IEPA indicate the presence of two large ponds, two small ponds, and additional, even smaller areas of ponding. Mobil has obtained a permit to pump the liquids from the lagoons back onto the "gypsum stack" and into the sediment control ponds.

4.5.2 Waste Characteristics

Surface water sample S305 was collected during the ESI from the sediment control pond, or "clearwater pond", located at the southeastern portion of the "gypsum stack". The analytical results of the surface water sample indicate that the water in this sediment control pond contains elevated levels of aluminum, ammonia, arsenic, cadmium, calcium, chromium, cobalt, iron, magnesium, mercury, nickel, potassium, sodium, sulfates, vanadium, and zinc (compared to background surface water sample S301). Based on a U.S. Department of Agriculture 1979 aerial photograph, the two large and several smaller sediment control ponds which existed on the "gypsum stack" at that time contained a total surficial area of nearly 20 acres. Note that this value was (and still may be) subject to relatively frequent change. The volume of the sediment control ponds has not been estimated due to this change and because the contour of the pond's bottoms are unknown.

4.5.3 Potentially Affected Pathways

All four pathways are potentially threatened by the hazardous substances present in the gypsum wastepile sediment control ponds. Since neither these surface impoundments nor the gypsum wastepile contains any known liner(s), the groundwater migration pathway is potentially at threat. The impoundments contain free liquids within sound diking that is regularly inspected and maintained and adequate freeboard. However, the lack of a liner poses a threat to the surface water migration pathway. As previously noted, the liquids which accumulated in these ponds was formerly routed to the lagoons and eventually to the creek and Lake DePue via Mobil's NPDES outfall. As noted in section 4.4.3, the gypsum stack, including the sediment control ponds, is located outside of the 100-year floodplain boundary and accessible, but not used for public recreation. Based on the analytical results of surface water sample S305, the release of ammonia (gaseous) from at least one of the sediment control ponds may create a threat to the air pathway.

4.6 LAGOONS

4.6.1 Description

Two (2) lagoons, or settling ponds, are located north of Lake DePue, just southwest of the Mobil and New Jersey Zinc NPDES outfalls which enter the lake. The long, narrow lagoons which lie side by side, contain surface water runoff from the plant and liquids from the gypsum wastepile ponds. When the Mobil plant was in operation, these settling lagoons received non-contact cooling water, precipitator/clarifier blowdown, sand filter backwash, boiler blowdown, softener regenerate wastewater, and some storm water runoff. Discharge from the lagoons was originally routed directly into Lake DePue through large drainage pipes located at the south end of each lagoon. Discharge from the lagoons (outfall 001) now flows eastward into the creek which receives New Jersey Zinc's NPDES effluent and flows into Lake DePue. Aerial photographs obtained from the U.S. Department of Agriculture indicate that the lagoons were constructed between mid-1964 and late-1970.

Mobil obtained approval (permit #1992-EA-0119) from the IEPA's Bureau of Water in April, 1992 to abandon the lagoons. The requirements of this abandonment include dewatering the lagoons, removing all sludges and sediments, and backfilling. The fluids will be placed on the gypsum wastepile. Since the lagoons will no longer be available to accept surface water runoff from the plant area, this runoff will also be routed to the gypsum wastepile.

4.6.2 Waste Characteristics

Two (2) samples, a sediment and a surface water sample, were collected from the northeast side of the eastern lagoon during the ESI. The analytical results of sediment sample X106 do not indicate that the lagoon sediments contain significantly elevated levels of inorganic parameters (compared to background sediment sample X103). The analytical results of surface water sample S304 indicate that the lagoon's liquid contents contain significantly elevated levels of aluminum, ammonia, arsenic, cadmium, calcium, cobalt, copper, iron, lead, manganese, nickel, selenium, sulfates, and zinc (compared to background surface water sample S301). Based on a U.S. Department of Agriculture 1988 aerial photograph, the two lagoons, equivalent in size, contain a total surficial area of approximately 1.25 acres. The volume of the lagoons has not been estimated because the contours of the lagoon bottoms are unknown.

4.6.3 Potentially Affected Pathways

Similar to the gypsum wastepile sediment control ponds, all four pathways are potentially threatened by the hazardous substances present in the lagoons. It is currently unknown whether either of these lagoons contains a natural or synthetic liner. However, the presence of a liner may be a moot point since the liquids contained in the lagoons are periodically released to surface waters, i.e., Lake DePue. In any case, since the surface impoundments are not considered to contain any known liner(s), the groundwater migration pathway is potentially at threat. The periodic release to surface water is obviously a threat to the surface water pathway. Based on Federal Emergency

Management Agency National Flood Insurance Program Flood Rate Insurance Maps, the lagoons are located partially, if not wholly, within the 100-year floodplain boundary. In addition, the lagoons are accessible, but not used for public recreation. Based on the analytical results of surface water sample S304, the release of ammonia (gaseous) from at least one of these surface impoundments may create a threat to the air pathway.

4.7 VANADIUM PENTOXIDE WASTE MATERIAL

4.7.1 Description

A relatively small mound of soil is located near the eastern end of the lithopone wastepiles/ridges on the north side of the railroad spur which serves the facility. The mound of soil covers drums of quartz rock and vanadium pentoxide (V_2O_2). The vanadium pentoxide was used to convert sulfur dioxide gas to sulfuric acid, an intermediate step in the production of diammonium phosphate fertilizer. It is unclear when these wastes were buried in this area, but it is presumed to have occurred during the active life of the fertilizer plant.

4.7.2 Waste Characteristics

Soil or waste material samples were not collected from this area during the ESI. However, as described above, the drums contain rock contaminated with spent vanadium pentoxide (CAS #1314-62-1). During an August 27, 1991 IEPA site visit, Mr. Robert Barnes of Mobil Mining and Minerals, who reported the material, estimated that approximately 25 drums were buried under the mound which he estimated to be 100 feet by 150 feet by 6 feet high.

4.7.3 Potentially Affected Pathways

Due to uncertain waste characteristics chemical properties associated with the wastes which may be present in this source, the threat to the migration pathways and the soil exposure route cannot be properly evaluated at this time. As additional information is gathered, the threat(s) will be properly evaluated.

4.8 WASTEPILE NEAR LAKE

4.8.1 Description

This source, perhaps one of the least visible sources of the New Jersey Zinc site, is located south of Marquette Street and the "plant area" and east of the Mobil and ZCA NPDES outfalls. The source is basically an accumulation of fill material, north of Lake DePue, which is composed of waste material which appears to be from the smelter. The black wastepile contains remnants of materials from the smelter. A discussion with a long-time resident of the area and aerial photographs indicate that the area was once used for "victory gardens" by local residents. Aerial photographs from 1951 and 1962 reveal what may have been the initial depositions in this area. A 1964 aerial photograph clearly indicates that material had been deposited at that time and an area of ponding on the eastern end of the source. A June 26, 1974 aerial photograph, taken during a flood period, shows the water in Lake DePue in contact with the south side of this wastepile. It does not appear that the wastepile has increased substantially since the late-1970s.

4.8.2 Waste Characteristics

Waste sample X116 was collected from the surface of this wastepile during the ESI. The analytical results of this waste sample indicate that the pile contains elevated levels of arsenic, barium, cadmium, chromium, cobalt, copper, cyanide, iron, lead, mercury, nickel, potassium, selenium, silver, and zinc (compared to background soil samples X101 and X102). Based on a U.S. Department of Agriculture 1979 aerial photograph, the wastepile occupies a basal area greater than 4 acres. The volume of the wastepile has not been estimated with any degree of certainty since the thickness of the wastepile is unknown, especially along the north and west sides of the source.

4.8.3 Potentially Affected Pathways

Similar to the circumstances described in section 4.3.3 above for the gob pile, all four pathways are potentially threatened by the hazardous substances present at the wastepile near Lake DePue. The wastepile does not contain any known liner, maintained engineered cover or run-on control system and runoff management system. The surface water runoff from the wastepile flows directly into the creek and Lake DePue. The contaminants found in the creek and the lake are similar to those contained in the wastepile. Based on Federal Emergency Management Agency National Flood Insurance Program Flood Rate Insurance Maps, the wastepile is located within the 100-year floodplain. The wastepile does have any containment designed, constructed, operated, or maintained to prevent a washout of hazardous substances in the event of a (100-year) flood. In addition, the wastepile is accessible but not used for public recreation. However, during a May 27, 1992 site visit, a cultivated garden with some vegetable plants was discovered just south, or near the base of, the wastepile. It would be nearly impossible to reach the garden without accessing the wastepile. In addition, a private road which is routinely travelled lies on top of the wastepile, and it does not contain any vegetative cover. Therefore, contaminated particulate matter from the wastepile creates a threat to the air pathway.

4.9 PLANT AREA CONTAMINATED SOILS AND FILL MATERIAL

4.9.1 Description

The "plant area" of the site is being defined as the area owned by the facilities where the smelter and the fertilizer manufacturing operations took place. The southern boundary is basically Marquette Street. The western boundary is the private properties and homes located along the eastern side of East Street, or the East Street Subdivision. The northern boundary may be described as being the base of the large hill, or topographic rise. The northeastern and eastern side is basically the Keim Addition of DePue and Broadway Street near the railroad overpass. The "soils" in this area basically consist of fill material from the smelter and manufacturing operations conducted at the site. During a March 2, 1992 reconnaisance visit to the site, IEPA personnel viewed an open excavation located located north of the large gob pile and east of the Mobil's sulfuric acid plant. At least two feet of black and brown fill/waste material was visible as the surface layer before any actual soil was encountered.

4.9.2 Waste Characteristics

Three (3) waste/soil samples were collected from within the upper one (1) foot of the "plant area" surface. The analytical results of waste/soil samples X109, X110, and X111 indicate that the surface layer, or fill, which is considered to be a wastepile, contains elevated levels of arsenic, barium, cadmium, calcium, cobalt, copper, iron, lead, magnesium, manganese, mercury, selenium, silver, and zinc (compared to background soil samples X101 and X102). Based on a U.S. Department of Agriculture 1988 aerial photograph, this wastepile occupies a basal area greater than 135 acres. This value, however, includes the lithopone wastepiles/ridges and the zinc smelting wastepile (gob pile). The volume of the plant area wastepile has not been estimated with any degree of certainty since the thickness of the waste throughout this source is unknown.

4.9.3 Potentially Affected Pathways

Similar to the circumstances described in section 4.3.3 above for the gob pile, all four pathways are potentially threatened by the hazardous substances present in the plant area contaminated fill. The fill, or wastepile, does not contain any known liner to prevent contaminants from migrating into groundwater. No maintained engineered cover or run-on control system and runoff management system is present to prevent contaminants from migrating to surface water. The majority of the surface water runoff from the plant area flows to New Jersey Zinc's NPDES outfall which enters the creek and Lake DePue. The contaminants found in the creek and the lake are similar to those contained in the wastepile. According to reports, Mobil currently routes surface water runoff from the plant area to the lagoons. Plans to remove the lagoons in the near future call for routing the surface water runoff from the plant area back to the gypsum wastepile. The plant area is located outside of the 100-year floodplain boundary. The plant area is freely accessible, but is not used for public recreation. Although some trees are present, especially at the southwest corner of the plant area, vegetative cover is sparse to nonexistent. The hazardous substances contained in the plant area fill material are a threat to the air migration pathway in the form of particulate matter. This threat is increased due to the large acreage involved with this source.

4.10 VILLAGE OF DEPUE CONTAMINATED SOILS

4.10.1 Description

The Hazard Ranking System (HRS) definition of a source includes "those soils taht have become contaminated from migration of a hazardous substance." Twenty (20) soil samples were obtained during the ESI from residential areas throughout the Village of DePue. Each of these shallow, soil samples contained contaminants which came to be deposited as a result of either the smelting operations or likely windblown from another source at the facility. Note that these samples were not collected from areas where a bulk quantity of waste was intentionally deposited, such as alleys or driveways which may have been purposely covered with slag or cinders. Based on current information, the extent of this source is defined by a line connecting soil samples X121, X120, X118, X123, X125, X127, X129, X130, and X137. This does not include other sources such as the "plant area" soils and the wastepile near the lake.

4.10.2 Waste Characteristics

The analytical results of soil samples X118 - X137, all collected within the upper one foot of soil, indicate that the soils which surround the former smelter contain significantly elevated levels of arsenic, barium, cadmium, calcium, copper, lead, magnesium, manganese, mercury, selenium, and zinc (compared to background soil samples X101 and X102). Based on a scaled map of the Village of DePue with the soil sampling locations plotted, greater than 200 acres of contaminated soil are defined by the soil sample locations. The volume of the contaminated soils source has not been estimated due to the uncertainties of the depth of contamination.

4.10.3 Potentially Affected Pathways

Similar to the circumstances described in section 4.9.3 above for the plant area fill, all four pathways are potentially threatened by the hazardous substances present in the village contaminated soils. The contaminated soil does not, of course, contain any liner to prevent contaminants from migrating into groundwater. No maintained engineered cover or run-on control system and runoff management system is present to prevent contaminants from migrating to surface water. The surface water runoff from the Village of DePue enters Lake DePue either directly or indirectly via the DePue POTW. The majority of the contaminated soils are located outside of the 100-year floodplain boundary, but the southernmost portion of the area of contamination is located within the 100-year floodplain boundary. Although not applicable, the contaminated soils are freely accessible and the White City Park is a designated public recreation area. Some areas of the contaminated soil contain vegetative cover, or lawns, and other areas, such as the East Street Subdivision, Padens Subdivision, and Park Subdivision areas contain sparse vegetation. The hazardous substances contained in the contaminated soil are a threat to the air migration pathway in the form of particulate matter.

SECTION 5

MIGRATION PATHWAYS

5.1 INTRODUCTION

This section includes data and information which may be useful in analyzing the impact of the New Jersey Zinc site on the four migration pathways identified in the CERCLA Hazard Ranking System (HRS). The four migration pathways are groundwater, surface water, air, and soil exposure.

5.2 GROUNDWATER PATHWAY

The groundwater pathway was not fully evaluated during this ESI as it is not considered to be a pathway of primary concern. Based in information obtained by the IEPA, the nearest private, potable water well is located approximately 4000 feet northeast of the former smelter. The DePue public water supply (PWS) wells are located at the southern edge of the village, just north of Lake DePue. These wells produce from deep, bedrock aquifers. Information collected during the investigation of the LUST incident on the Mobil property indicates that the shallow, unconfined aquifer of the glacial drift flows toward the south or southeast. The area north of Lake DePue has been known to contain groundwater seeps, or springs. The gradient of the bedrock aquifers is not known. No karst topography is known to exist in the general area.

The population served by groundwater wells located within four miles of the site has not been determined. Some of the sources at the site lie within the 1000 feet radius Wellhead Protection Area of the DePue Public Water Supply wells.

5.2 SURFACE WATER PATHWAY

Surface water runoff from the area near the gypsum wastepile enters an unnamed tributary of Negro Creek. Negro Creek flows eastward and then southward and empties into Lake DePue and/or the Illinois River. Surface water runoff from the majority of the site and the Village of DePue flows into Lake DePue which also flows into the Illinois River. (Appendix B of this report contains a "15-Mile Surface Water Map".)

According to a Federal Emergency Management Agency National Flood Insurance Program Flood Insurance Rate Map, some sources at the site lie within the 100-year flood boundary. The presence of a 500-year flood boundary is unknown. Based on IEPA data, there are no known surface water intakes within fifteen miles downstream (of the PPE) of the site. Therefore, there is little or no threat to the surface water drinking water pathway. According to the Illinois Department of Conservation, Lake DePue is a commercial fishery, therefore, the site presents a threat to the surface water human foodchain pathway. Sensitive environments located downstream of the site include wetlands which border the entire perimeter of Lake DePue and wetlands which border the Illinois River. U.S. Geological Survey information indicates that the average discharge of the Illinois River at the Henry, Illinois gaging station (05558300) is 15,350 cubic feet per second. This gaging station is located greater than fifteen miles downstream of the PPE.

5.4 AIR PATHWAY

The spread of contaminants to the residential soils throughout DePue is believed to have occurred as particulate matter (dust) via the air pathway. This dust is believed to have been generated by operations conducted at the smelting facility and wind. The particulate matter is believed to have originated with active operations at the smelter and the matter which composes the wastepiles. IEPA is unaware of any quantitative sampling performed to document the release of hazardous substances to the air pathway, specifically inorganic contaminants.

Based on the analytical results of soil and waste material samples collected during this ESI, the potential for windblown particulates to carry contaminants off-site is likely since contaminants are present in top six inches of soil and wastepiles. In addition, some of these areas contain sparse, if any, vegetation. In some areas, traffic routinely stirs-up dust. The analytical results of surface water samples collected during this ESI also indicate the potential for gaseous contaminants, i.e., ammonia, to be released to the air pathway.

Table 5-1

Air Pathway Target Populations

Distance from Site in miles	Population
On-site (workers)	3
On-site (residents)	1116
>0 - 1/4	262
>1/4 - 1/2	78
>1/2 - 1	49
>1 - 2	632
>2 - 3	290
>3 - 4	1041
	Total: 3471

Current targets for the air pathway include more than 1000 people who reside on the site (refer to Section 2). This does not include the three (3) people currently employed at New Jersey Zinc and Mobil facilities. As shown in Table 5-1, above, a total of nearly 3500 people reside within four miles of the site. (This information is based on a USGS topographic map house count and census data which indicates an average of 2.59 persons per home in Bureau and Putnam Counties.) Targets also include several acres of wetlands within the target distance limits.

5.5 SOIL EXPOSURE PATHWAY

The analytical data generated during this SSI indicates that the soil and wastes at the site contain significant concentrations of contaminants within one foot of the surface. Nearly all of the site is accessible. Some areas, such as White City Park located in northeastern DePue, are used for public recreation. More than 400 residences are located on the site due to the fact that a large area of contaminated soil has been identified. According to U.S. Department of Interior Fish and Wildlife Service National Wetlands Inventory maps, wetlands exist on the site.

APPENDIX A

Site 4-Mile Radius Map

APPENDIX B

15-Mile Surface Water Map

APPENDIX C

DePue Residential Soil Sample Location Map

APPENDIX D

Screening Site Inspection Photographs

APPENDIX E

Target Compound List

TARGET COMPOUND LIST

Volatile Target Compounds

Chloromethane
Bromomethane
Vinyl Chloride
Chloroethane
Methylene Chloride
Acetone
Carbon Disulfide
1,1-Dichloroethene
1,1-Dichloroethane
1,2-Dichloroethene (total)
Chloroform
1,2-Dichloroethane
2-Butanone
1,1,1-Trichloroethane
Carbon Tetrachloride
Vinyl Acetate
Bromodichloromethane
1,2-Dichloropropane
cis-1,3-Dichloropropene
Trichloroethene
Dibromochloromethane
1,1,2-Trichloroethane
Benzene
trans-1,3-Dichloropropene
Bromoform
4-Methyl-2-pentanone
2-Hexanone
Tetrachloroethene
1,1,2,2-Tetrachloroethane
Toluene
Chlorobenzene
Ethylbenzene
Styrene
Xylenes (total)

Base/Neutral Target Compounds

Hexachloroethane
bis(2-Chloroethyl)Ether
Benzyl Alcohol
bis(2-Chloroisopropyl)Ether
N-Nitroso-Di-n-Propylamine
Nitrobenzene
Hexachlorobutadiene
2-Methylnaphthalene
1,2,4-Trichlorobenzene
Isophorone
Naphthalene
4-Chloroaniline
bis(2-chloroethoxy)Methane
Hexachlorocyclopentadiene
2-Chloronaphthalene
2-Nitroaniline
Acenaphthylene
3-Nitroaniline
Acenaphthene
Dibenzofuran
Dimethyl Phthalate
2,6-Dinitrotoluene
Fluorene
4-Nitroaniline
4-Chlorophenyl-phenylether
2,4-Dinitrotoluene
Diethylphthalate
N-Nitrosodiphenylamine
Hexachlorobenzene
Phenanthrene
4-Bromophenyl-phenylether
Anthracene
Di-n-Butylphthalate
Fluoranthene
Pyrene
Butylbenzylphthalate
bis(2-Ethylhexyl)Phthalate
Chrysene
Benzo(a)Anthracene
3,3'-Dichlorobenzidene
Di-n-Octyl Phthalate
Benzo(b)Fluoranthene
Benzo(k)Fluoranthene
Benzo(a)Pyrene
Indeno(1,2,3-cd)Pyrene
Dibenz(a,h)Anthracene
Benzo(g,h,i)Perylene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene

Acid Target Compounds

Benzoic Acid
Phenol
2-Chlorophenol
2-Nitrophenol
2-Methylphenol
2,4-Dimethylphenol
4-Methylphenol
2,4-Dichlorophenol
2,4,6-Trichlorophenol
2,4,5-Trichlorophenol
4-Chloro-3-methylphenol
2,4-Dinitrophenol
2-Methyl-4,6-dinitrophenol
Pentachlorophenol
4-Nitrophenol

Pesticide/PCB Target Compounds

alpha-BHC
beta-BHC
delta-BHC
gamma-BHC (Lindane)
Heptachlor
Aldrin
Heptachlor epoxide
Endosulfan I
4,4'-DDE
Dieldrin
Endrin
4,4'-DDD
Endosulfan II
4,4'-DDT
Endrin Ketone
Endosulfan Sulfate
Methoxychlor
alpha-Chlorodane
gamma-Chlorodane
Toxaphene
Aroclor-1016
Aroclor-1221
Aroclor-1232
Aroclor-1242
Aroclor-1248
Aroclor-1254
Aroclor-1260

Inorganic Target Compounds

Aluminum
Antimony
Arsenic
Barium
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Mercury
Nickel
Potassium
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc
Cyanide
Sulfide
Sulfate

APPENDIX F

Summary of ESI Organic Surface Water Analytical Results

DePue / New Jersey Zinc / Mobil Chem.
ILD 062 340 641

VOLATILE ORGANIC COMPOUNDS	S301 3-12-92 Surf. Water Turner Lake "Background" ug/l	S302 3-10-92 SW w/ X104 Lake DePue (BG-S301) ug/l	S303 3-10-92 SW w/ X105 Ditch/L.DePue (BG-S301) ug/l	S304 3-10-92 SW w/ X106 Mobil Lagoon (BG-none) ug/l	S305 3-10-92 SW w/ X107 Gypsum Stack (BG-none) ug/l
Chloromethane	10 U	10 U	10 U		10 U
Bromomethane	10 U	10 U	10 U	NOTE:	10 U
Vinyl Chloride	10 U	10 U	10 U	VOC sample	10 U
Chloroethane	10 U	10 U	10 U	bottles were	10 U
Methylene Chloride	10 U	10 U	10 U	accidentally	10 U
Acetone	10 U	10 U	10 U	broken during	10 U
Carbon Disulfide	10 U	10 U	10 U	shipment.	10 U
1,1-Dichloroethene	10 U	10 U	10 U		10 U
1,1-Dichloroethane	10 U	10 U	10 U		10 U
1,2-Dichloroethene(total)	10 U	10 U	10 U		10 U
Chloroform	10 U	10 U	10 U		10 U
1,2-Dichloroethane	10 U	10 U	10 U		10 U
2-Butanone (MEK)	10 U	10 U	10 U		10 U
1,1,1-Trichloroethane	10 U	10 U	10 U		10 U
Carbon Tetrachloride	10 U	10 U	10 U		10 U
Bromodichloromethane	10 U	10 U	10 U		10 U
1,2-Dichloropropane	10 U	10 U	10 U		10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U		10 U
Trichloroethene	10 U	10 U	10 U		10 U
Dibromochloromethane	10 U	10 U	10 U		10 U
1,1,2-Trichloroethane	10 U	10 U	10 U		10 U
Benzene	10 U	10 U	10 U		10 U
Trans-1,3-Dichloropropene	10 U	10 U	10 U		10 U
Bromoform	10 U	10 U	10 U		10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U		10 U
2-Hexanone	10 U	10 U	10 U		10 U
Tetrachloroethene	10 U	10 U	10 U		10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U		10 U
Toluene	10 U	10 U	10 U		10 U
Chlorobenzene	10 U	10 U	10 U		10 U
Ethylbenzene	10 U	10 U	10 U		10 U
Styrene	10 U	10 U	10 U		10 U
Xylene(total)	10 U	10 U	10 U		10 U

DePue / New Jersey Zinc / Mobil Chem.
ILD 062 340 641

SEMIVOLATILE ORGANIC COMPOUNDS	S301 3-12-92 ug/l	S302 3-10-92 ug/l	S303 3-10-92 ug/l	S304 3-10-92 ug/l	S305 3-10-92 ug/l
Phenol	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl) ether	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
4-Methylphenol	10 U	10 U	10 U	10 U	10 U
N-Nitroso-di-n-Dipropylamine	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
bis(2-Chloroethoxy) Methane	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U	25 U	25 U	25 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	25 U	25 U	25 U	25 U	25 U
Dimethylphthalate	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ
Acenaphthene	10 U	10 U	10 U	10 U	10 U

DePue / New Jersey Zinc / Mobil Chem.
ILD 062 340 641

SEMIVOLATILE ORGANIC COMPOUNDS	S301 3-12-92 ug/l	S302 3-10-92 ug/l	S303 3-10-92 ug/l	S304 3-10-92 ug/l	S305 3-10-92 ug/l
2,4-Dinitrophenol	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ
4-Nitrophenol	25 U	25 U	25 U	25 U	25 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenyl ether	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	25 U	25 U	25 U	25 U	25 U
4,6-Dinitro-2-Methylphenol	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ
N-Nitrosodiphenylamine [1]	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
4-Bromophenyl-phenylether	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ
Phenanthrene	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U
Carbazole	10 U	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	10 U	10 U	10 U
Benzo(a)anthracene	10 U	10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	10 U	2 J	10 U	10 U	10 U
Di-n-Octylphthalate	10 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	10 U	10 U	10 U
Dibenz(a,h)anthracene	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U	10 U	10 U	10 U

[1] - Cannot be separated from Diphenylamine

APPENDIX G

Summary of ESI
Organic Soil, Sediment and Waste
Analytical Results

DePue / New Jersey Zinc / Mobil Chem.
ILD 062 340 641

VOLATILE ORGANIC COMPOUNDS	X103 3-10-92 Sed w/S301 TurnerLake "Background" ug/kg	X104 3-10-92 Sed w/S302 Lake DePue (BG-X103) ug/kg	X105 3-10-92 Sed w/S303 Ditch/Lake (BG-X103) ug/kg	X106 3-10-92 Sed w/S304 Mob.Lagoon (BG-none) ug/kg	X107 3-11-92 Waste Mat'l. Gyp. Stack (BG-none) ug/kg	X108 3-10-92 Sed. from Ditch/Creek (BG-X103)? ug/kg	X109 3-11-92 On-site Soil Mobil Prop. ug/kg
Chloromethane	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Bromomethane	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Vinyl Chloride	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Chloroethane	15 UJ	18 U	21 U	15 U	15 U	22 UJ	11 U
Methylene Chloride	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Acetone	21 U	18 U	14 J	23	15 U	22 U	11 U
Carbon Disulfide	15 U	18 UJ	10 J	15 UJ	15 UJ	22 U	11 UJ
1,1-Dichloroethene	15 U	18 U	21 U	15 U	15 U	22 U	11 U
1,1-Dichloroethane	15 U	18 U	21 U	15 U	15 U	22 U	11 U
1,2-Dichloroethene(total)	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Chloroform	15 U	18 U	21 U	15 U	15 U	22 U	11 U
1,2-Dichloroethane	15 U	18 U	21 U	15 U	15 U	22 U	11 U
2-Butanone (MEK)	15 U	18 U	21 U	15 U	15 U	22 U	11 U
1,1,1-Trichloroethane	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Carbon Tetrachloride	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Bromodichloromethane	15 U	18 U	21 U	15 U	15 U	22 U	11 U
1,2-Dichloropropane	15 U	18 U	21 U	15 U	15 U	22 U	11 U
cis-1,3-Dichloropropene	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Trichloroethene	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Dibromochloromethane	15 U	18 U	21 U	15 U	15 U	22 U	11 U
1,1,2-Trichloroethane	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Benzene	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Trans-1,3-Dichloropropene	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Bromoform	15 U	18 U	21 U	15 U	15 U	22 U	11 U
4-Methyl-2-Pentanone	15 U	18 U	21 U	15 U	15 U	22 U	11 U
2-Hexanone	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Tetrachloroethene	15 U	18 U	21 U	15 U	15 U	22 U	11 U
1,1,2,2-Tetrachloroethane	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Toluene	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Chlorobenzene	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Ethylbenzene	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Styrene	15 U	18 U	21 U	15 U	15 U	22 U	11 U
Xylene(total)	15 U	18 U	21 U	15 U	15 U	22 U	11 U
TIC Ethyl Ether [CAS #60 29 3]	8 JN	-	- -	- -	- -		-

DePue / New Jersey Zinc / Mobil Chem.
ILD 062 340 641

SEMIVOLATILE ORGANIC COMPOUNDS	X103	X104	X105	X106	X107	X108	X109
	3-10-92	3-10-92	3-10-92	3-10-92	3-11-92	3-10-92	3-11-92
	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Phenol	490 U	580 U	330 J	50 J	500 U	710 U	360 U
bis(2-Chloroethyl) ether	490 U	580 U	700 U	480 U	500 UJ	710 U	360 U
2-Chlorophenol	490 U	580 U	700 U	480 U	500 U	710 U	360 U
1,3-Dichlorobenzene	490 U	580 U	700 U	480 U	500 U	710 U	360 U
1,4-Dichlorobenzene	490 U	580 U	700 U	480 U	500 U	710 U	360 U
1,2-Dichlorobenzene	490 U	580 U	700 U	480 U	500 U	710 U	360 U
2-Methylphenol	490 U	580 U	700 U	480 U	500 U	710 U	360 U
2,2'-oxybis(1-Chloropropane)	490 U	580 U	700 UJ	480 UJ	500 UJ	710 UJ	360 UJ
4-Methylphenol	490 U	580 U	700 U	480 U	500 U	710 U	360 U
N-Nitroso-di-n-Dipropylamine	490 U	580 U	700 U	480 U	500 UJ	710 U	360 U
Hexachloroethane	490 U	580 U	700 U	480 U	500 U	710 U	360 U
Nitrobenzene	490 U	580 U	700 U	480 U	500 U	710 U	360 U
Isophorone	490 U	580 U	700 U	480 U	500 U	710 U	360 U
2-Nitrophenol	490 U	580 U	700 U	480 U	500 UJ	710 U	360 U
2,4-Dimethylphenol	490 U	580 U	700 U	480 U	500 UJ	710 U	360 U
bis(2-Chloroethoxy) Methane	490 U	580 U	700 U	480 U	500 U	710 U	360 U
2,4-Dichlorophenol	490 U	580 U	700 U	480 U	500 U	710 U	360 U
1,2,4-Trichlorobenzene	490 U	580 U	700 U	480 U	500 U	710 U	360 U
Naphthalene	490 U	580 U	700 U	480 U	500 U	710 U	360 U
4-Chloroaniline	490 UJ	580 UJ	700 UJ	480 UJ	500 UJ	710 UJ	360 UJ
Hexachlorobutadiene	490 U	580 U	700 U	480 U	500 U	710 U	360 U
4-Chloro-3-Methylphenol	490 U	580 U	700 U	480 U	500 U	710 U	360 U
2-Methylnaphthalene	490 U	580 U	700 U	480 U	500 U	330 J	360 U
Hexachlorocyclopentadiene	490 U	580 U	700 U	480 U	500 UJ	710 U	360 U
2,4,6-Trichlorophenol	490 U	580 U	700 U	480 U	500 U	710 U	360 U
2,4,5-Trichlorophenol	1200 U	1400 U	1700 U	1200 U	1200 U	1700 U	860 U
2-Chloronaphthalene	490 U	580 U	700 U	480 U	500 U	710 U	360 U
2-Nitroaniline	1200 U	1400 U	1700 UJ	1200 UJ	1200 UJ	1700 UJ	860 UJ
Dimethylphthalate	490 U	580 U	700 U	480 U	500 U	710 U	360 U
Acenaphthylene	490 U	580 U	700 U	480 U	500 U	710 U	360 U
2,6-Dinitrotoluene	490 U	580 U	700 U	480 U	500 U	710 U	360 U
3-Nitroaniline	1200 U	1400 U	1700 U	1200 U	1200 U	1700 U	860 U
Acenaphthene	490 U	580 U	700 U	480 U	500 U	710 U	360 U

DePue / New Jersey Zinc / Mobil Chem.
ILD 062 340 641

SEMIVOLATILE ORGANIC COMPOUNDS	X103 3-10-92 ug/kg	X104 3-10-92 ug/kg	X105 3-10-92 ug/kg	X106 3-10-92 ug/kg	X107 3-11-92 ug/kg	X108 3-10-92 ug/kg	X109 3-11-92 ug/kg
2,4-Dinitrophenol	1200 UJ	1400 UJ	1700 U	1200 U	1200 UJ	1700 U	860 U
4-Nitrophenol	1200 U	1400 U	1700 U	1200 U	1200 U	1700 U	860 U
Dibenzofuran	490 U	580 U	700 U	480 U	500 U	710 U	360 U
2,4-Dinitrotoluene	490 U	580 U	700 U	480 U	500 U	710 U	360 U
Diethylphthalate	490 U	580 U	700 U	480 U	500 U	710 U	360 U
4-Chlorophenyl-phenyl ether	490 U	580 U	700 U	480 U	500 U	710 U	360 U
Fluorene	490 U	580 U	700 U	480 U	500 U	710 U	360 U
4-Nitroaniline	1200 UJ	1400 UJ	1700 UJ	1200 UJ	1200 U	1700 UJ	860 UJ
4,6-Dinitro-2-Methylphenol	1200 U	1400 U	1700 U	1200 U	1200 UJ	1700 U	860 U
N-Nitrosodiphenylamine [1]	490 UJ	580 UJ	700 U	480 U	500 UJ	710 U	360 U
4-Bromophenyl-phenylether	490 U	580 U	700 U	480 U	500 U	710 U	360 U
Hexachlorobenzene	490 UJ	580 UJ	700 U	480 U	500 U	710 U	360 U
Pentachlorophenol	1200 U	1400 U	1700 U	1200 U	1200 U	1700 U	860 U
Phenanthrene	490 U	67 J	100 J	50 J	500 U	190 J	52 J
Anthracene	490 U	580 U	700 U	480 U	500 U	710 U	360 U
Carbazole	490 U	580 U	700 U	480 U	500 U	710 U	360 U
Di-n-Butylphthalate	490 U	580 U	700 U	480 U	500 U	710 U	360 U
Fluoranthene	490 U	150 J	220 J	120 J	500 U	160 J	60 J
Pyrene	490 U	230 J	230 J	190 J	500 U	200 J	55 J
Butylbenzylphthalate	490 U	580 U	700 U	480 U	500 UJ	710 U	360 U
3,3'-Dichlorobenzidine	490 UJ	580 UJ	700 U	480 U	500 U	710 U	360 U
Benzo(a)anthracene	490 U	580 U	110 J	180 U	500 U	120 J	360 U
Chrysene	490 U	130 J	150 J	100 J	500 U	170 J	360 U
bis(2-Ethylhexyl)phthalate	490 U	650	750	370	120 J	120 J	360 U
Di-n-Octylphthalate	490 UJ	580 UJ	700 U	480 U	500 UJ	710 U	360 U
Benzo(b)fluoranthene	490 U	580 U	190 J	170 J	500 U	320 J	360 U
Benzo(k)fluoranthene	490 UJ	580 UJ	97 J	480 UJ	500 U	710 UJ	360 UJ
Benzo(a)pyrene	490 UJ	580 UJ	110 J	61 J	500 U	130 J	360 UJ
Indeno(1,2,3-cd)pyrene	490 U	580 U	700 U	480 U	500 U	710 U	360 U
Dibenz(a,h)anthracene	490 U	580 U	700 U	480 U	500 U	710 U	360 U
Benzo(g,h,i)perylene	490 U	580 U	700 U	480 U	500 U	710 U	360 U
TIC: Benzaldehyde [CAS #100-52-7]	--	--	7800 JN	--	--	--	--

[1] - Cannot be separated from Diphenylamine

APPENDIX H

Summary of ESI
Inorganic Surface Water
Analytical Results

DePue / New Jersey Zinc / Mobil Chem. – ILD 062 340 641

	S301		S302	S303	S304	S305
	3-12-92		3-10-92	3-10-92	3-10-92	3-10-92
	Surf. Water		SW w/ X104	SW w/ X105	SW w/ X106	SW w/ X107
	Turner Lake	3 * S301	Lake DePue	Ditch/L.DePue	Mob.Lagoon	Gyp. Stack
	"Background"		(BG-S301)	(BG-S301)	(BG-none)	(BG-none)
INORGANICS	(ug/l)		(ug/l)	(ug/l)	(ug/l)	(ug/l)
Aluminum	118 B	354	1780 HRS	380 HRS	2490	2630
Antimony	42.0 U	42.0	42.0 U	42.0 U	42.0 U	42.0 U
Arsenic	2.6 J		2.3 BJ	2.0 UJ	19.4 J	368
Barium	40.5 B	122	66.0 B	54.2 B	25.7 B	55.8 B
Beryllium	1.0 U	1.0	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	5.0 UJ	5.0	13.1 J	86.8 J	56.9 J	38.5 J
Calcium	7400	22,200	110,000 HRS	127,000 HRS	105,000	299,000
Chromium	3.0 UJ	3.0	3.0 UJ	3.0 UJ	3.0 UJ	33.0
Cobalt	3.0 UJ	3.0	22.9 B	59.4 HRS	253	44.4 B
Copper	5.0 U	5.0	36.8 HRS	130 HRS	86.2	18.0 U
Iron	345	1035	1330 HRS	706	1720	3340
Lead	1.0 U	1.0	4.0 U	7.6 U	40.4	5.7 U
Magnesium	31,100	93,300	44,900	55,900	47,200	421,000
Manganese	135	405	2180 HRS	5040 HRS	15,300	4810
Mercury	0.09 B	0.27	0.02 B	0.05 B	0.06 B	0.30
Nickel	13.0 U	13.0	13.0 U	40.3 HRS	222	147
Potassium	3740	11,220	5740	5190	9630	87,300
Selenium	1.55 UJ	1.55	10.0 J	10.0 J	11.0 J	18.0 J
Silver	5.0 U	5.0	5.0 U	5.0 U	5.0 U	5.0 U
Sodium	28,300	84,900	54,100	61,700	29,800	675,000
Thallium	3.0 U	3.0	3.0 U	3.0 U	3.0 UJ	3.6 BJ
Vanadium	3.0 U	3.0	9.14 B	3.0 U	7.23 B	21.9 B
Zinc	17.9 B	54	5310 HRS	26,500 HRS	62,700	517
Cyanide	10 U	10	10 U	10 U	10 U	10 U
Sulfide	1000 U	1000	1000 U	1000 U	1000 U	1000 U
Sulfate	86,000	258,000	222,000	342,000 HRS	650,000	3,480,000
Ammonia	10 U	10	618 HRS	2380 HRS	54,600	346,000

APPENDIX I

Summary of ESI
Inorganic Soil, Sediment and Waste
Analytical Results

DePue / New Jersey Zinc / Mobil Chem. – ILD 062 340 641

	X101		X102		X103		X104		X105		X106	X107
	3-11-92		3-11-92		3-10-92		3-10-92		3-10-92		3-10-92	3-11-92
	Tiskilwa Res.		Tiskilwa Res.		Sed w/S301		Sed w/S302		Sed w/S303		Sed w/S304	Waste Mat'l.
	Soil Type "8"	3 * X101	Soil Type "9"	3 * X102	Turner Lake	3 * X103	Lake DePue		Ditch/Lake		Mob.Lagoon	Gyp. Stack
	"Background"		"Background"		"Background"		(BG-X103)		(BG-X103)		(BG-none)	(BG-none)
INORGANICS	*(mg/kg)*		*(mg/kg)*		*(mg/kg)*		*(mg/kg)*		*(mg/kg)*		*(mg/kg)*	*(mg/kg)*
Aluminum	8750	26,250	11,000	33,000	16,900	50,700	32,100		28,100		12,700	855
Antimony	6.6 BJ		5.1 UR		6.4 BJ		6.9 UR		12.2 UJ		7.2 J	6.5 UR
Arsenic	4.5	13.5	6.0	18	8.6	26	16.7		15.3		8.7	0.31 UJ
Barium	104	312	174	522	112	336	244		214		70.5	22.9 B
Beryllium	0.56 B	1.68	0.74	2.22	0.87	2.61	1.4		1.4 U		0.70	0.15 U
Cadmium	0.68 U	0.68	0.71	2.13	0.96	2.88	12.3	HRS	275	HRS	0.56 U	0.77 U
Calcium	7020	21,060	13,400	40,200	19,300	57,900	19,700		15,600		46,600	125,000
Chromium	14.2	42.6	19.2	57.6	31.7	95.1	77.9		49.0		21.0	2.6
Cobalt	5.2 B	15.6	6.0 B	18	8.12	24.36	14.0		51.1	HRS	10.1	0.46 U
Copper	13.7	41.1	23.6	70.8	19.7	59.1	73.1	HRS	4420	HRS	18.9	1.5 B
Iron	10,600	31,800	16,100	48,300	19,300	57,900	31,900		37,100		19,700	706
Lead	117	351	207	621	75.6	226.8	109		128		12.3	6.7
Magnesium	3290	9870	6440	19,320	9610	28,830	12,000		9620		25,700	40 B
Manganese	382	1146	576	1728	537	1611	677		1390		388	3.6
Mercury	0.08 UJ	0.08	0.10 UJ	0.10	0.02 UJ	0.02	0.51 UJ		0.93 J		0.08 UJ	0.12 UJ
Nickel	11.9	35.7	15.6	46.8	26.8	80.4	47.8		67.8		24.6	2.0 U
Potassium	1900	5700	2740	8220	3270	9810	5450		5450		3070	100 U
Selenium	0.37 B	1.11	0.17 B	0.51	0.32 B	0.96	1.6 J		2.5 J		0.56 BJ	0.15 UR
Silver	0.68 U	0.68	0.60 U	0.60	0.75 U	0.75	0.82 U		2.2 B		0.56 U	0.81 B
Sodium	117 U	117	140 B	420	245 B	735	538 B		508 B		187 B	258 B
Thallium	0.41 UR		0.36 UR		0.45 UR		0.49 UR		0.63 UR		0.58 BJ	0.46 UR
Vanadium	20.5	61.5	25.5	76.5	37.8	113.4	57.9		51.4		26.9	2.4 B
Zinc	124	372	296	888	173.0	519	2170	HRS	64,800	HRS	141	6.9 U
Cyanide	1.1 U	1.1	1.1 U	1.1	1.2 U	1.2	1.5 U		1.7 U		1.0 U	1.2 U

DePue / New Jersey Zinc / Mobil Chem. – ILD 062 340 641

	X108		X109	X110	X111	X112	X113	X114	X115	X116	X117
	3-10-92		3-11-92	3-11-92	3-11-92	3-11-92	3-11-92	3-11-92	3-11-92	3-10-92	3-11-92
	Sed. from Ditch/Creek (BG-X103)?		On-site Soil Mobil Prop. (BG-none)	On-site Soil ZCA Property (BG-none)	On-site Soil Mobil Prop. (BG-none)	Waste Mat'l. ZCA Gob Pile (BG-none)	Waste Mat'l. ZCA Gob Pile (BG-none)	Waste Mat'l. ZCA Ridge (BG-none)	Waste Mat'l. ZCA Ridge (BG-none)	Waste/Fill Mat'l East of Creek (BG-none)	Duplicate of X115
INORGANICS	*(mg/kg)*		*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*
Aluminum	12,100		5620	9280	6130	23,500	14,500	11,100	11,200	6870	11,200
Antimony	1.1 UJ		4.6 UR	4.9 UJ	5.3 UR	7.8 UJ	8.4 UJ	8.1 UR	8.1 UR	5.7 UJ	8.2 UR
Arsenic	19.5		14.3	268	113	144	164	236	5.1	124	6.8
Barium	710	HRS	56.9	3510	4860	111	140	291	121,000	993	92,400
Beryllium	0.85 B		0.35 B	1.5	1.4	1.1	1.0	0.74 B	1.5	0.63 B	1.5
Cadmium	112	HRS	20.6	278	55.0	365	591	105	0.96 U	81.9	0.70 U
Calcium	42,900		81,100	4340	4820	12,000	9580	1760	10,100	5320	9740
Chromium	24.2		11.4	20.9	28.4	38.3	34.9	46.4	25.9	593	23.0
Cobalt	50.8	HRS	5.6	30.5	10.4	31.6	62.0	40.9	0.58 U	26.9	0.59 U
Copper	3400	HRS	94.1	1960	717	8070	6200	5900	262	2040	119
Iron	32,600		14,100	64,700	199,000	126,000	103,000	126,000	22,800	56,000	21,600
Lead	354	HRS	155	17,800	33,400	3040	7030	3656	834	4400	872
Magnesium	9450		37,100	1590	663	829 B	1940	923 B	5840	2530	5610
Manganese	2020	HRS	444	2830	1870	3140	2820	1560	327	1550	300
Mercury	0.69 UJ		0.27 UJ	0.77 J	0.43 UJ	0.17 UJ	0.12 UJ	0.48 UJ	0.16 UJ	4.39 J	0.10 UJ
Nickel	21.8		10.7	24.3	13.9	27.9	34.4	32.4	32.1	411	21.6
Potassium	2250		1460	982	704	320 B	1500	273 B	3060	1010	3460
Selenium	0.84 B		0.11 UJ	8.2	2.1 J	35.0	13.3	13.9	0.66 BJ	5.8	2.1 J
Silver	2.5 B		1.9	34.5	26.9	45.9	17.2	53.7	3.60	21.3	0.98 U
Sodium	889 B		161 B	360 U	372 U	849 U	1130	252 U	614 U	263 B	514 U
Thallium	0.81 UR		0.33 UR	0.35 UR	0.38 UR	0.56 UJ	0.60 UR	0.58 UR	0.55 UR	0.41 UR	0.56 U
Vanadium	27.9		14.6	34.2	30.9	53.5	47.3	54.3	101	26.8	99.1
Zinc	22,500	HRS	4510	65,600	22,900	105,000	148,000	19,300	656	22,500	327
Cyanide	2.3 U		0.92 U	1.0 U	0.98 U	30.0	14.4	17.6	1.6 U	1.0	1.6 U

DePue / New Jersey Zinc / Mobil Chem. – ILD 062 340 641

	X118	X119	X120	X121	X122	X123	X124
	3-11-92	3-11-92	3-11-92	3-11-92	3-11-92	3-11-92	3-11-92
	Residential	Residential	Residential	Residential	Residential	Residential	Residential
	1526 Marquette	1312 Marquette	419 N.Mason	431 Oak	111 Mason	NWc Grant&Western	304 E.Fourth
	(BG-X102)	(BG-X101)	(BG-X101)	(BG-X101)	(BG-X101)	(BG-X101/2)	(BG-X101)
INORGANICS	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*
Aluminum	11,900	17,600	12,900	12,500	17,000	16,500	8340
Antimony	6.7 UR	8.2 UR	5.4 UR	5.2 UR	5.2 UR	5.8 UR	5.8 UR
Arsenic	9.3	27.2 J	27.1 J	11.2 J	18.6 J	20.0 J	7.6 J
Barium	436	268	996 HRS	295	204	335	782 HRS
Beryllium	0.72 B	0.79 B	0.69	0.58 B	0.83	0.86	0.52 B
Cadmium	24.0 HRS	47.8 J	52.0 J	4.6 J	13.2 J	53.1 J	22.6 J
Calcium	7160	29,300 HRS	2220	12,300	28,400 HRS	5860	4710
Chromium	18.2	25.2	19.9	18.5	24.0	38.8	13.8
Cobalt	8.9	10.2	10.3	7.26	9.1	9.2	4.9
Copper	32.4	77.5 J	115 J	17.7 J	32.8 J	82.7 J	35.2 J
Iron	13,900	23,100	19,500	14,400	20,000	19,800	15,000
Lead	157	400 HRS	512 HRS	35.9	51.4	410	183
Magnesium	2360	4310	2350	7280	17,600 HRS	2880	1980
Manganese	1260	933	975	738	1180 HRS	1110	411
Mercury	0.12 UJ	0.42 U	0.30 U	0.09 U	0.09 U	0.32 U	0.08 U
Nickel	15.5	17.9	17.3	14.7	21.1	16.9	11.9
Potassium	2050	3320	1930	2030	3880	2860	1540
Selenium	0.29 B	1.3 J	1.2 HRS	0.38 BJ	0.56 BJ	1.3	0.46 J
Silver	0.80 U	0.98 UJ	1.6 J	0.62 UJ	0.62 UJ	1.2 J	0.70 UJ
Sodium	148 U	173 U	110 U	121 U	155 U	191 U	119 U
Thallium	0.48 UR	0.59 UJ	0.39 UJ	0.38 UJ	0.38 UJ	0.41 UJ	0.42 UJ
Vanadium	31.7	41.4	30.4	32.3	39.6	36.7	22.2
Zinc	1740 HRS	2820 HRS	3070 HRS	467 HRS	1210 HRS	2790	1820 HRS
Cyanide	1.4 U	1.7 U	1.2 U	1.1 U	0.99 U	1.2 U	1.1 U

DePue / New Jersey Zinc / Mobil Chem. – ILD 062 340 641

	X125	X126	X127	X128	X129	X130	X131
	3-11-92	3-11-92	3-11-92	3-12-92	3-12-92	3-12-92	3-12-92
	Residential	Residential	Residential	Residential	Residential	Residential	Residential
	316 South St.	150 E.Fourth	Schoolyard	113 Union	204 Poplar	204 High	308 Trenton
	(BG-X102)	(BG-X101)	(BG-X102)	(BG-X101)	(BG-X101)	(BG-X101)	(BG-X101)
INORGANICS	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*
Aluminum	11,700	14,500	11,700	20,100	10,100	11,600	9360
Antimony	5.3 UR	7.0 UR	5.2 UR	5.5 UR	5.2 UR	5.5 UR	5.5 UR
Arsenic	13.5 J	12.0 J	17.8 J	13.7 J	21.4 J	17.6 J	32.4 J
Barium	5130 HRS	2480 HRS	736 HRS	223	3760 HRS	6300 HRS	8710 HRS
Beryllium	0.74	0.84	0.67	0.77	0.66	0.68	0.59 B
Cadmium	97.3 J	76.8 J	18.8 J	4.32 J	37.6 J	90.2 J	73.6 J
Calcium	15,800	6870	6590	4740	2810	15,100	7360
Chromium	19.5	23.3	19.0	26	17.3	17.3	16.2
Cobalt	5.98 B	8.2 B	9.2	8.25	7.88	4.6 B	2.96 B
Copper	82.7 J	55.8 J	31.9 J	15.4 J	37.1 J	65.5 J	61.7 J
Iron	19,600	19,900	20,500	19,300	20,100	15,800	14,900
Lead	729 HRS	252	150	38.4	207	565 HRS	542 HRS
Magnesium	2790	3230	3820	5320	1920	6040	4090
Manganese	110	580	664	678	1040	604	532
Mercury	0.13 U	0.14 U	0.10 U	0.08 U	0.12 U	0.13 U	0.12 U
Nickel	16.8	18.6	20.3	16.9	16.5	12.5	11.8
Potassium	2080	3300	2500	2780	870	2270	1920
Selenium	1.1 J	0.77 J	0.44 BJ	0.33 BJ	0.46	0.99 J	1.1
Silver	1.37 J	0.84 UJ	0.62 UJ	0.66 UJ	0.62 UJ	0.66 UJ	0.66 UJ
Sodium	147 U	161 U	109 U	116 U	92.5 U	128 U	105 U
Thallium	0.38 UJ	0.50 UJ	0.38 UJ	0.39 UJ	0.37 UJ	0.40 UJ	0.40 UJ
Vanadium	29.6	34.5	29.5	42.5	29.3	24.3	23.8
Zinc	6030 HRS	4060 HRS	1520 HRS	329	2240 HRS	5290 HRS	3780 HRS
Cyanide	1.1 U	1.3 U	1.1 U	1.1 U	1.0 U	1.2 U	1.1 U

DePue / New Jersey Zinc / Mobil Chem. – ILD 062 340 641

	X132		X133		X134		X135		X136		X137	
	3-12-92		3-12-92		3-12-92		3-12-92		3-12-92		3-12-92	
	Residential		Residential		Residential		Residential		Residential		Residential	
	121 East St.		229 East St.		423 East St.		545 East St.		635 East St.		674 East St.	
	(BG-X101)		(BG-X101)		(BG-X101)		(BG-X101)		(BG-X102)		(BG-X102)	
INORGANICS	*(mg/kg)*		*(mg/kg)*		*(mg/kg)*		*(mg/kg)*		*(mg/kg)*		*(mg/kg)*	
Aluminum	9340		10,700		6470		15,300		12,300		8440	
Antimony	5.0 UR		5.5 UR		4.9 UR		6.0 UR		6.7 UR		5.5 UR	
Arsenic	15.8 J		10.7 J		13.7 J		16.9 J		12.1 J		4.7 J	
Barium	2050	HRS	5560	HRS	6080	HRS	2250	HRS	3330	HRS	88.2	
Beryllium	0.66		0.83		0.64		0.73		0.52 B		0.44 B	
Cadmium	16.2 J		61.2 J		80.6 J		98.1 J		85.7 J		22.2 J	
Calcium	12,600		12,100		13,200		28,500	HRS	12,200		48,600	HRS
Chromium	15.8		20.6		13.5		25.4		20.6		14.2	
Cobalt	5.2 B		5.6 B		2.8 B		7.1 B		5.9 B		5.01 B	
Copper	30.4 J		110 J		64.2 J		163 J		81.2 J		26.8 J	
Iron	16,500		17,700		12,400		17,100		14,500		10,800	
Lead	126		371	HRS	432	HRS	393	HRS	440		85.9	
Magnesium	7140		5870		6550		2600		3190		24,300	HRS
Manganese	454		523		480		518		466		305	
Mercury	0.10 U		0.30 U		0.09 U		0.11 U		0.13 U		0.08 U	
Nickel	15.7		17.4		11.9		17.8		12.7		9.9	
Potassium	1950		2680		1320		2820		2030		2150	
Selenium	0.17 BJ		0.92 J		0.82 J		1.0 J		1.4 J		0.66 UJ	
Silver	0.60 UJ		1.3 J		0.65 BJ		1.2 BJ		1.2 BJ		0.66 UJ	
Sodium	127 U		178 U		121 U		195 U		143 U		140 U	
Thallium	0.36 UJ		0.39 UJ		0.35 UJ		0.43 UJ		0.48 UJ		0.39 UJ	
Vanadium	22.7		25.7		18.6		35.8		29.5		19.8	
Zinc	1490	HRS	4240	HRS	5190	HRS	6580	HRS	5640	HRS	2190	HRS
Cyanide	0.99 U		1.1 U		0.99 U		1.2 U		1.3 U		1.0 U	

APPENDIX I

U.S.E.P.A. DEFINED DATA QUALIFIERS

QUALIFIER	DEFINITION ORGANICS	DEFINITION INORGANICS
• U	Compound was tested for but not detected. The sample quantitation limit must be corrected for dilution and for percent moisture. For soil samples subjected to GPC clean-up procedures, the CRQL is also multiplied by two, to account for the fact that only half of the extract is recovered.	Analyte was analyzed for but not detected.
• J	Estimated value. Used when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed or when the mass spectral data indicate the presence of a compound that meets the identification criteria and the result is less than the sample quantitation limit but greater than zero. Used in data validation when the quality control data indicate that a value may not be accurate.	Estimated value. Used in data validation when the quality control data indicate that a value may not be accurate.
• C	This flag applies to pesticide results where the identification is confirmed by GC/MS.	Method qualifier indicates analysis by the Manual Spectrophotometric method.
• B	Analyte was found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action	The reported value is less than the CRDL but greater than the instrument detection limit (IDL).
• D	Identifies all compounds identified in an analysis at a secondary dilution factor. If a sample or extract is re-analyzed at a higher dilution factor as in the "E" flag above, the "DL" suffix is appended to the sample number on the Form I for the diluted sample, and <u>all</u> concentration values are flagged with the "D" flag.	not used

QUALIFIER	DEFINITION ORGANICS	DEFINITION INORGANICS
• E	Identifies compounds whose concentrations exceed the calibration range for that specific analysis. All extracts containing compounds exceeding the calibration range must be diluted and analyzed again. If the dilution of the extract causes any compounds identified in the first analysis to be below the calibration range in the second analysis, then the results of both analyses must be reported on separate Forms I. The Form I for the diluted sample must have the "DL" suffix appended to the sample number.	The reported value is estimated because of the presence of interference
• A	This flag indicates that a TIC is a suspected aldol concentration product formed by the reaction of the solvents used to process the sample in the laboratory.	Method qualifier indicates analys by Flame Atomic Absorption (AA
• M	not used	Duplicate injection (a QC parame not met.
• N	not used	Spiked sample (a QC parameter) recovery not within control limits
• S	not used	The reported value was determin by the Method of Standard Additions (MSA).
• W	not used	Post digestion spike for Furnace analysis (a QC parameter) is out control limits of 85% to 115% recovery, while sample absorban is less than 50% of spike absorbance.
• *	not used	Duplicate analysis (a QC parame not within control limits.
• +	not used	Correlation coefficient for MSA (QC parameter) is less than 0.99

QUALIFIER	DEFINITION ORGANICS	DEFINITION INORGANICS
• P	not used	Method qualifier indicates analys by ICP (Inductively Coupled Plasma) Spectroscopy.
• CV	not used	Method qualifier indicates analys by Cold Vapor AA.
• AV	not used	Method qualifier indicates analys: by Automated Cold Vapor AA
• AS	not used	Method qualifier indicates analys: by Semi-Automated Cold Spectrophotometry.
• T	not used	Method qualifier indicates Titrimetric analysis.
• NR	The analyte was not required to be analyzed.	The analyte was not required to analyzed.
• R	Rejected data. The QC parameters indicate that the data is not usable for any purpose.	Rejected data. The QC paramete indicate that the data is not usab for any purpose.

Trip Report - DePue/New Jersey Zinc/Mobil Chemical 2/5/93

Trip Date: February 4, 1993

Attending:

Cindy Nolan, USEPA RPM	Bruce Ford, IEPA SAM
Kerry Street, USEPA Rem. Mgr.	Terry Ayers, IEPA Remedial Mgr.
Steve Mason, USEPA ORC	Rich Lang, IEPA PM
	Virginia ??, IEPA CRC

The purpose of this memo is to summarize salient technical points about this site and describe the short term tasks which must be completed prior to preparing a case strategy for presentation to the SCAM RDT.

The Site has seen extensive State involvement over the years. Current actions and active permits are held by Mobil for an NPDES discharge and solid waste closure of certain units on site. An NPDES permit is also held by New Jersey Zinc. The State has extensive files in Air, Water and Solid Waste Divisions. An Expanded Site Inspection (ESI) for NPL listing was completed by IEPA. *A key component of the site strategy will be to determine what role Superfund should play in relation to existing program authorities and actions.*

Summary of key source areas of the Site

This joint Mobil, NJ Zinc site is no longer an active manufacturing facility. Most all of the buildings were demolished and taken off-site last year. What remains are very large process residue piles, large areas of unvegetated ground surface, and surface water impoundments used for treatment of surface water drainage.

NJ Zinc owns approximately 60 acres. Mobil owns approximately 750 acres, including access rights to Lake DePue. As noted on the attached map, this Site is a dominant feature within the Village of DePue (population 1900). Since this facility operated as a smelter, significant portions of residential property are contaminated with inorganics from air releases. Also, slag and other contaminated materials were taken off-site for use as road, and other fill and bedding uses. Thus, the actual size of the Site is unknown, but will be expected to be well beyond property boundaries. Existing residential soil contamination is estimated at over 200 acres. *Implications:* Very expensive and lengthy RI work on nature and extent of soil and ground water contamination.

Ground water samples were not taken during the ESI, but may be taken during an UST action approved by IEPA.

1. Zinc Smelting Slag pile:

This piles covers approximately 15 acres. It contains significantly elevated concentrations of arsenic, cadmium, cobalt, copper, cyanide, iron, lead, manganese, selenium silver, sodium and zinc. In October, 1981, IEPA entered a Consent Decree with NJ Zinc to cover the zinc wastepile, install a sewer system to collect surface water runoff from the area near the pile and on the pile and establish a sampling and monitoring program. Currently, the top of the pile is well vegetated, but the highly eroded slopes are completely exposed. Drainage from the area is brilliant aqua green to a cloudy light green color (likely copper), extending from the pile all the way down to Lake DePue via a man-made discharge channel. This discharge is covered by an NPDES permit. It does not appear likely that permit conditions are being met. The existing enforcement status is unknown.

Ground water in the area of the pile is very shallow because this lower portion of the site may be filled lowland area. As a result, it is likely that a significant portion of the drainage from the NPDES outfall is from ground water infiltration.

Remedies:

Due to the size of the pile and the lack of suitable treatment technologies, it is likely that on-site *containment via capping will be the presumptive remedy.* Due to the capped top of the pile, dust is probably a minor, but potential short-term problem. *The immediate problem is the possible direct contact threat and ecological risk from the existing (NPDES permitted) drainage.* There is an obvious need to look at treatment trains to eliminate these threats. (Stavaros, do you need to sample the green ponded areas to establish threat?) There may or may not be a need to do some preliminary ground water work (hydropunch?) to define treatment capacity. Since the ground water may also contain arsenic, sulfur and ammonia or other contaminants from other areas of the plant, some ground water sampling may be needed.

2. Lithopone Waste Ridges:

The lithopone ridges were created from waste product in the manufacture of zinc based paint. Two samples from these piles were taken during the ESI and found to contain a similar suite of contaminants. Pursuant to the above mentioned Consent Decree, two of the lithopone ridges were neutralized with lime, and soil covered. Most of the ridges are exposed without vegetative cover. In a small area near the lithopone waste is an area containing approximately 25 drums of vanadium pentoxide waste (used to convert sulfur dioxide gas to sulfuric acid in the DAP process).

Remedies:

Due to the size of these ridges and lack of viable treatment technologies, *the presumptive remedy will likely be containment via capping*. Proper capping would eliminate contaminated surface drainage (currently draining into NPDES permitted outfall noted above). Dust control is likely needed in the short term. *The drums of vanadium pentoxide will need to be sampled and may require off-site treatment and/or disposal.*

3. Gypsum Waste Pile:

This waste pile is the dominant feature on the site. It covers at least 150 acres. The gypsum is waste product from the manufacture of diammonium phosphate fertilizer (DAP) produced when Mobil purchased property from NJ Zinc. Sulfur and metallic sulfide with phosphate rock and ammonia were reacted to produce phosphoric acid and calcium sulfate (gypsum). It was the ammonia and phosphoric acid which were combined to produce the DAP. Surface water and leachate from the pile are part of an active (permitted?) treatment system (discussed below). The pile contains high level of naturally occurring radon from the phosphate rock. The treatment process may have concentrated the radon. The leachate may contain high levels of nitrogen and sulfur in various oxidation states. However, no other contaminants appear to be a problem. The gypsum pile is scheduled for closure under State solid waste closure regulations (when?).

Remedies:

The waste pile will need to be closed; *containment by capping is the presumptive remedy*. Dust control measures may be needed in the short term. We will need to explore potential issues with radon (is leaching to ground water a concern?).

4. *Gypsum sediment control ponds*

The waste gypsum discussed above was deposited in a slurry form from the manufacture of DAP. *Settling and evaporation ponds* were created to control the liquids which leached out of the pile during natural dewatering. These ponds are located on top of the gypsum pile. It should be noted that most of the leachate generated from the pile likely becomes a ground water problem. This sedimentation and evaporation approach is not likely an effective means of managing water generated.

Remedies:

Upon closure of the gypsum pile, these ponds will be eliminated.

5. Clearwater pond

This pond is adjacent to the gypsum stack. It is not an active part of the leachate control system. Some of this water was used as make-up water in production processes, but not returned to the pond. (which ones?) However, as evidenced by the high sulfur, ammonia and heavy metals data, it is impacted.

Remedies:

Too early to say. No immediate threats. Keep as part of the RI/FS process.

6. The Mobile lagoons

When the sulfuric and/or phosphoric acid plants operated, water was taken from Lake DePue, used in non-contact cooling and discharged to the lagoons for settling prior to discharge back to Lake DePue. The ponds also received surface water runoff and some liquids from the gypsum ponds. The ponds are no longer used, even for surface runoff. Mobile has obtained a State permit to close the lagoons, removing the sediment and backfilling. The standing water will be pumped to the top of the gypsum pile for evaporation. Sediment disposal location is unknown at this time. The lagoons are within the 100 year floodplain.

Remedies:

None needed if all work proceeds under NPDES as planned.

7. Smelter waste pile

It is unknown how or why this waste pile was created. It appears to contain general smelter related waste and possibly waste from other areas of the plant. Samples taken show high inorganic contaminants. *This are is accessible to the public, vegetation is sparse.* It is also within the 100 year floodplain.

Remedies:

Access is a problem in the short term. Containment is a likely long term action, however, stability in the floodplain should be evaluated in the RI/FS.

8. Plant Area

The plant area itself comprises over 100 acres of industrial use property which is comprised of contaminated fill, documented to be about 2 feet thick in one sample. Vegetation is sparse where present. Fugitive dust may be a problem in the hot, dry months. Access is a problem in limited areas.

<u>Idealized strategy</u> (subject to change as more information becomes available:

Due to the extent of existing State authorities and pending actions, removal actions may not be necessary. Instead, State actions could proceed (maybe as a designated priority at the State), and the Administrative Order on Consent (AOC) for RI/FS may incorporate shorter term actions such as dust control and securing site access (as well as RD and RA review for consistency with the NCP for closure activities under State permits). This innovative AOC approach would allow Superfund to proceed on the lengthy and expensive RI, while other programs concurrently commence with closure activities as appropriate. Such an allows Superfund resources and attention to be spent where there is the greatest perceived risk - the areawide problems of ground water and surficial soil (residential) contamination. DOJ review of the AOC is not envisioned.

However, depending on how the other State programs intend to proceed, some removal actions may need to be considered. If that is likely, then removal actions would focus on: 1) dust control; 2) site access; 3) disposal of contaminated sediments; and, 4) discharge water from the gob pile (currently under NPDES permit). Other removal actions may be considered (such as the presumptive remedies noted above) as the project progresses, however, those noted here are probably priorities.

cc: Kerry Street
Stavros Emmanouil
Eileen Helmer
Alan Alter
Tom Marks
Doug Ballotti
Steve Mason
Bruce Ford, IEPA
Terry Ayers, IEPA

Short term tasks needed prior to finalizing site strategy:

Task	**Responsible Staff**	**Target Completion**
1. Determine financial status of NJZ. Begin action to freeze assets if necessary	Steve Mason	End of week: 2/26
2. Issue 104(e)s	Cindy Nolan	2/26
3. Prepare Gen. Not. Ltrs.	Cindy Nolan	3/5
4. Get ATSDR opinion on residential soil	Cindy Nolan	on-going
5. Transfer State files to USEPA, conf. calls w/other State program offices	Bruce Ford	on-going
6. Review site for Removal action and imminent ecological risk	Stavros Emmanouil, Eileen Helmer	2/19
7. Contact Mobil/NJZ when GNL issued: 1) other PRPs?, 2) other actions contemplated?	Steve Mason, Cindy Nolan, IEPA	3/12
8. Finalize site strategy	Everyone	3/19
9. Meet with RDT	Everyone	3/26

Most actions are concurrent. Tasks are simple, but coordination logistics always take more time than expected. Critical path is file transfer from IEPA (and conference calls with other State programs), and removal program assessment.

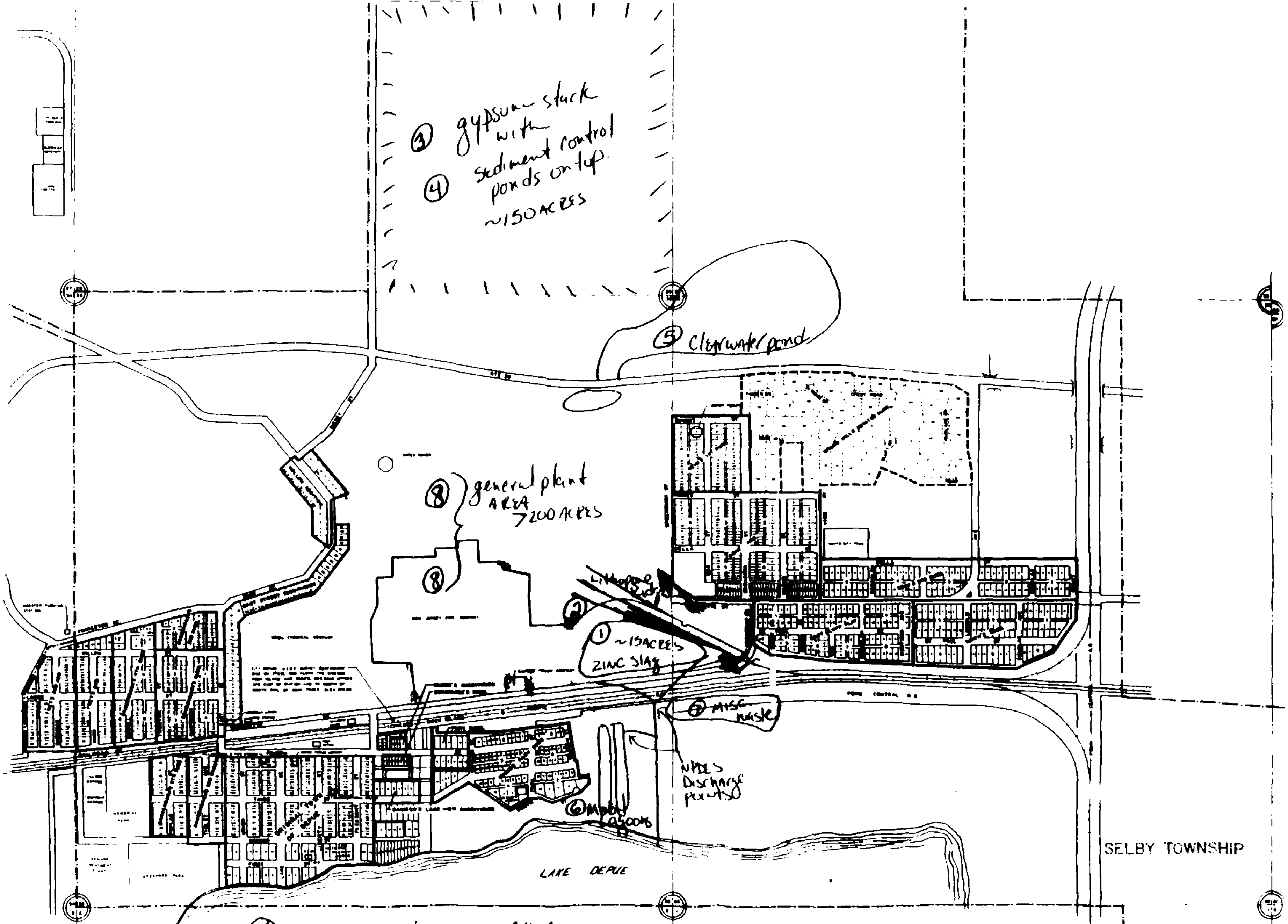
DePue / New Jersey Zinc / Mobile Chemical

	Waste Areas
106 1° Zinc smelting (Coal & ?) → Zinc slab (→ Autos, appliances), Sulfuric Acid, Zinc dust (→ paint additive for corrosion resistance) → 1970	① & ⑦
1923 Lithopone Mfg. (→ Zinc pigment) → 1956	②
1966 Sulfuric Acid Mfg. → 1971 ～～～→ 1990 quartz rock, vanadium dioxide, sulfur dioxide gas } sulfuric acid	⑧ & ② V_2O_5 only ⑥
DAP Mfg. { 1966 Phosphoric Acid Mfg. → 1971 ～～～→ 1990 Sulfur, metallic sulfides, phosphate rock, Ammonia } Phosphoric Acid, Calcium sulfate (gypsum)	⑧ & ⑥
	③ & ④
1966 DAP Mfg. → 1971 ～～～→ 1990 Ammonia, phosphoric acid } DAP	⑥
1971 2° Zinc smelting (Scrap zinc & ?) → 1990	⑧ & ⑦

New Jersey Zinc → operated

Mobile ～～→ operated

Most process reactions, feed materials & products not well understood at this time.



⑪ - see memo discussing AREA.
- Approximate NJ Zinc property (~60 ACRES)
- Approximate Mobil property (~720 ACRES)

Mobil leased property in 1971, purchased in 1975.

SUBDIVISION MAP
VILLAGE OF DEPUE
BUREAU COUNTY, ILLINOIS

1A. Cost Center:	TAT ZONE II CONTRACT CONTRACT NO. 68-WO-0037 TECHNICAL DIRECTION DOCUMENT (TDD) ECOLOGY AND ENVIRONMENT, INC.	2. No.: T05-9302-013
1B. Account No.:		Amendment

3A. Priority: [X] High [ ] Medium [ ] Low

4A. Estimate of Total Hours: 120
Total Costs: 9600

5A. EPA Site Name: New Jersey Zinc

7. CERCLIS ID:

5B. SSID No.:

5C. City / County / State: DePere / Brown / WI

8A. Completion Date: 6/30/93

3B. Key EPA Contact:
Name: Emmanouil
Phone:

4B. Overtime Approved: [X] Yes [ ] No

6. Source of Funds: [X] CERCLA [ ] OPA [ ] UST [ ] CEPP [ ] Other

8B. Reference Info: [ ] Yes [X] No [ ] Attached [ ] Pick-up

9. Type of Activity:

OPA
- [ ] SPCC
- [ ] On-Scene Monitoring
- [ ] Spill Clean-up Funded

CERCLA
- [X] Site Assessment
- [ ] Removal Funded
- [ ] Removal PRP (AO/CO)
- [ ] On-Site Monitoring

AS SPECIFIED ABOVE
- [ ] Special Project
- [ ] Analytical Project
- [ ] Corp. Special Project
- [ ] Preparedness
- [ ] UST
- [ ] FEMA
- [ ] Quality Assurance
- [ ] Training
- [ ] Program Management
- [ ] Technical Assistance
- [ ] Information Management

10. General Task Description:

11. Desired Report Form:
- [X] Formal Report
- [ ] Letter Report
- [ ] Formal Briefing
- [ ] Other (Specify)

12. Specific Elements:

Prepare and implement Health & Safety Plan; compile available information; conduct site inspection; conduct air monitoring as appropriate; ~~prepare and implement sampling plan; if requestedby OSC;~~ evaluate threat to human health and environment; provide verbal briefings to OSC as necessary; document on-site activities; provide photodocumentation; ~~develop alternative removal approaches with cost estimates; if requested by OSC;~~ assist with preparation of information for Action ~~Memo, if requested by OSC.~~ Confirms verbal given on 2/9/93.

Confirms verbal given on 2/9/93.

13. Interim Deadlines:

14. Authorizing DPO: Gail C. Nabasny
Signature

15. Date: 2/26/93

16. Received by: [X] Accepted [ ] Accepted with Exceptions (Attached) [ ] Rejected
TATL Signature

17. Date: 2/26/93

Distribution
Sheet 1 White - DPO Copy
Sheet 2 Blue - TATL Copy
Sheet 3 Green - ZPM Copy
Sheet 4 Canary - PO Copy
Sheet 5 Pink - CO Copy
Sheet 6 Goldenrod - DPO Original (Unsigned by TATL)

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